



Special focus on the COVID-19 pandemic

UIC SAFETY UNIT
UIC Safety Report 2021
Significant Accidents 2020
Public Report

September 2021



INTERNATIONAL UNION
OF RAILWAYS

ISBN 978-2-7461-3126-2

Warning

No part of this publication may be copied, reproduced or distributed by any means whatsoever, including electronic, except for private and individual use, without the express permission of the International Union of Railways (UIC). The same applies for translation, adaptation or transformation, arrangement or reproduction by any method or procedure whatsoever. The sole exceptions - noting the author's name and the source - are "analyses and brief quotations justified by the critical, argumentative, educational, scientific or informative nature of the publication into which they are incorporated" (Articles L 122-4 and L122-5 of the French Intellectual Property Code).

© International Union of Railways (UIC) - Paris, 2021

UIC Safety Report 2021

Table of contents

Foreword by the UIC Director General

UIC Safety Database Members and data availability

Executive summary by the Chairman of the Safety Performance Group

Part 1 - General report on significant accidents 2020

Part 2 - Time series and trends

Part 3 - Focus on the effect of the COVID-19 pandemic on traffic and accidentality

Foreword

This is UIC's 15th report on rail safety around the world: 15 years of system improvement with the number of accidents falling by half in most countries – this is the result of a proactive policy prioritising safety.

This report is derived from information contained in the UIC Safety Database, which is provided by UIC members on a voluntary basis. This database launched in 2006 with 19 members but has grown over time and now boasts 35 contributing members.

The momentum is powerful. This year, four new companies are included in the report: FGC and Euskotren (Spain), LTG (Lithuania) and NRIC (Bulgaria), following three new members in 2019 and four new members in 2020.

I urge all UIC member infrastructure managers to provide the Safety Database with information about any significant accidents that have taken place on their network. Completeness is necessary to ensure the quality of our analyses, and UIC can be of most value to its members when information is shared and then processed together.

UIC was founded almost a century ago and this longevity is proof of its importance to its members. But we shall not rest upon our laurels. Let us work together to strengthen the railway system and show that we offer the only sustainable form of transport, in both the short and the long term.

We would like to thank all those of you who contribute and those who are planning to contribute very soon, and we hope that those of our members who have not yet considered the issue give it careful thought.

François Davenne
UIC Director General

UIC Safety Database Members and data availability

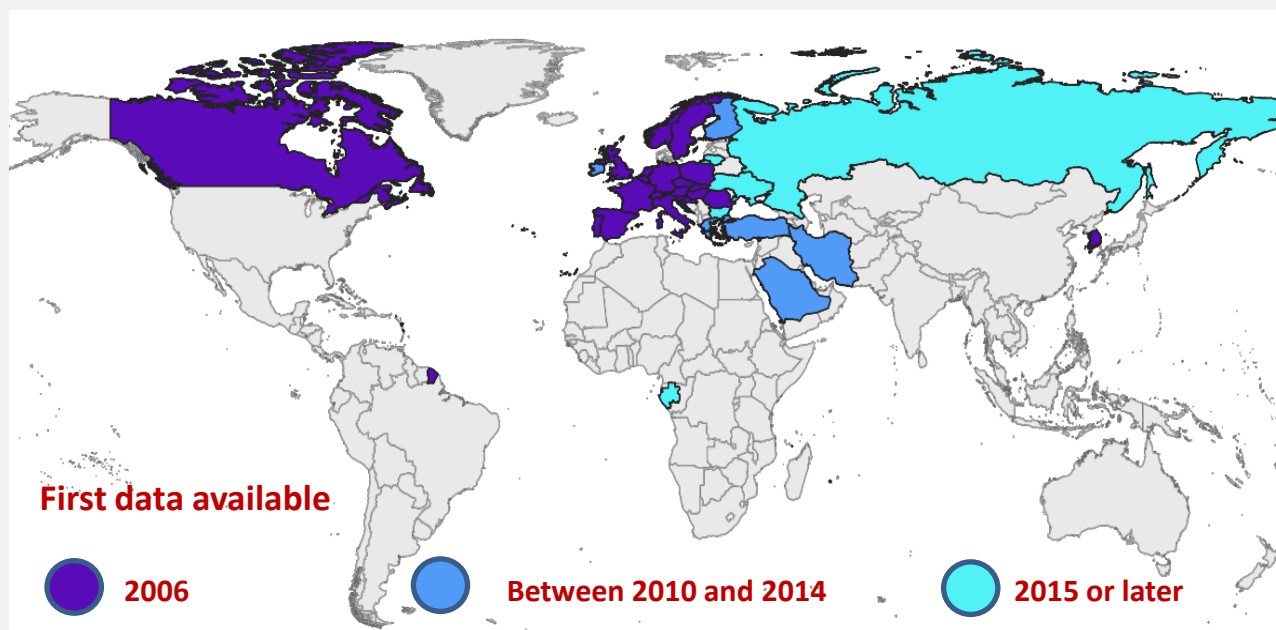
Company	Country	Code
ADIF	Spain	ES
Bane NOR SF	Norway	NO
CANADA ³	Canada	CA
CFL	Luxembourg	LU
CFR SA	Romania	RO
CIE	Ireland	IE
DB AG ²	Germany	DE
EUSKOTREN	Spain	ES
FGC	Spain	ES
FTIA	Finland	FI
HZ	Croatia	HR
Infrabel ²	Belgium	BE
IP	Portugal	PT
KRRI	South Korea	KR
LTG	Lithuania	LT
MÁV	Hungary	HU
NRIC	Bulgaria	BG
ÖBB	Austria	AT

Company	Country	Code
OSE ⁴	Greece	GR
PKP	Poland	PL
PRORAIL ¹	Netherlands	NL
RAI	Iran	IR
RFI	Italy	IT
RSSB ²	United Kingdom	GB
RŽD	Russia	RU
SAR	Saudi Arabia	SA
SBB CFF FFS ²	Switzerland	CH
SETRAG	Gabon	GA
SNCF Réseau ²	France	FR
SŽ (si)	Slovenia	SI
SŽ (cz)	Czechia	CZ
TCDD	Turkey	TR
Trafikverket ²	Sweden	SE
UŽ	Ukraine	UA
ŽSR	Slovakia	SK

¹ Chair and ² Members of the Safety Performance Group

³ All infrastructure managers. Data extracted from the TSB website: www.tsb.gc.ca/fra/stats/rail/data-5.html

⁴ Data provided by RAS-EL, railway regulatory authority

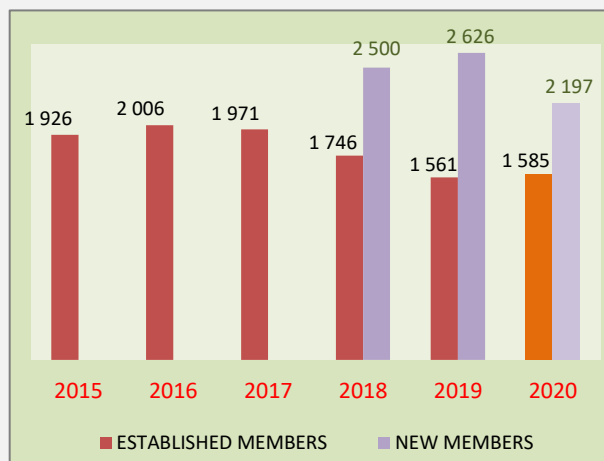


Executive summary

Globally and for railway safety the year 2020 has been a strange year, due to the COVID-19 pandemic. Train and road traffic were considerably lower than in previous years due to the various lock downs. The expected lower numbers of significant accidents and fatalities per trainkilometer are only visible for level crossing accidents (-10%). In 2020 we did not experience major train collisions nor major derailments, resulting in the low number of passenger victims (59) ever observed. The perimeter of this report has been extended by five new infrastructure managers in three different countries.

Number of significant accidents

From 2006 till 2014 the annual number of significant accidents has decreased with around 25%. In the period of 2015-2018 we see a slow decrease from around 1900 to 1750 significant accidents per year. The number of significant accidents declared by established members in 2019 (1561) was lower than all previous years. Expected lower numbers in 2020 due to the pandemic is not recorded for the established members. The reasons behind this will need further investigation. In contrast the group of new members does show a lower number of significant accidents in 2020.

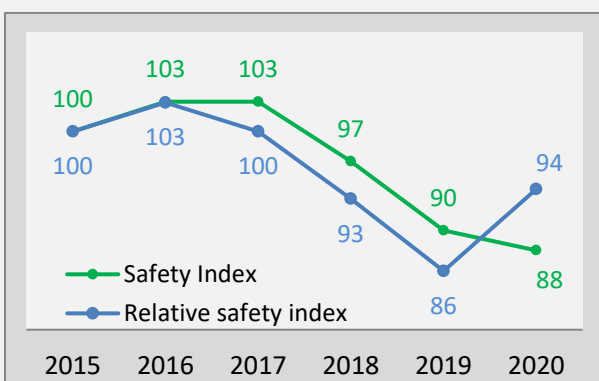


Number of fatalities (excepting Lithuania and Bulgaria)

In 2020 we recorded 2303 fatalities. The types of accidents the railway sector can influence most directly (train collisions, derailments, fires and shunting operations) show a decrease of 10 fatalities, mostly due to the absence of large scale train collisions and derailments, which is good news. On level crossings we see 10% less fatalities, probably due to less train-kilometers and road traffic. The number of fatalities related to individuals hit by train has increased +3%, which is contrary to lower number of train-kilometers.

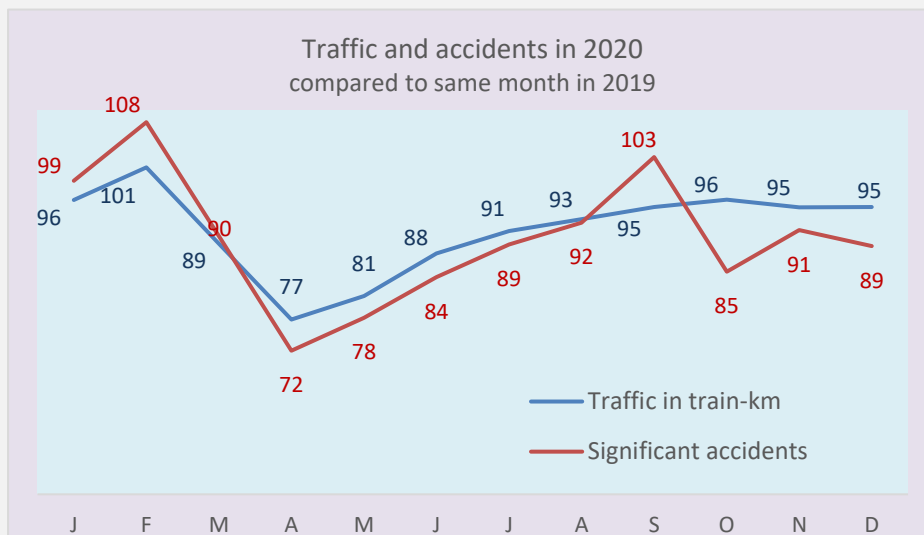
Fatalities	2019	2020	Diff.
Individual hit by train or falling from a train (outside LC)	1 893	1 953	60
Level crossing accidents	337	305	-32
Other accidents (train collisions, derailments, fires and shunting operations)	55	45	-10
Total	2 285	2 303	18

UIC Safety Index (established members)



The UIC Safety Index is actually a weighted number of accidents, whereby passenger and staff victims and internal causes are weighted more heavily than trespasser victims and external causes. In addition, a higher number of victims is weighted more heavily than a lower number. After a plateau 2015-2017, we see a steady improvement in 2018-2019, but in 2020 the expected lower index (due to the lower numbers of train-kilometers) is not there. In 2020, The relative safety index (safety index per train-kilometers) is worse than in 2019.

COVID-19 pandemic



Due to the COVID-19 lock downs we see 20% less train kilometers in Q2-2020 and also less significant accidents.

In 2019 we seem to have higher numbers of significant accidents in the second half year. This possible seasonal effect will need further investigation.

On level crossings we can see that the number of train-kilometers does not fully explain the lower numbers of accidents. We see here the effect of less road traffic in March, April and October.

Strangely, less people outside due to lockdowns and curfews does not result in less persons hit by train outside the level crossings. Does this mean that a considerable portion of these people are there on purpose?

A concerning observation around staff victims is that in 2020 we see more staff victims seemingly related to human factor causes. Could it be that our workforce has been distracted by the COVID-19 pandemic?

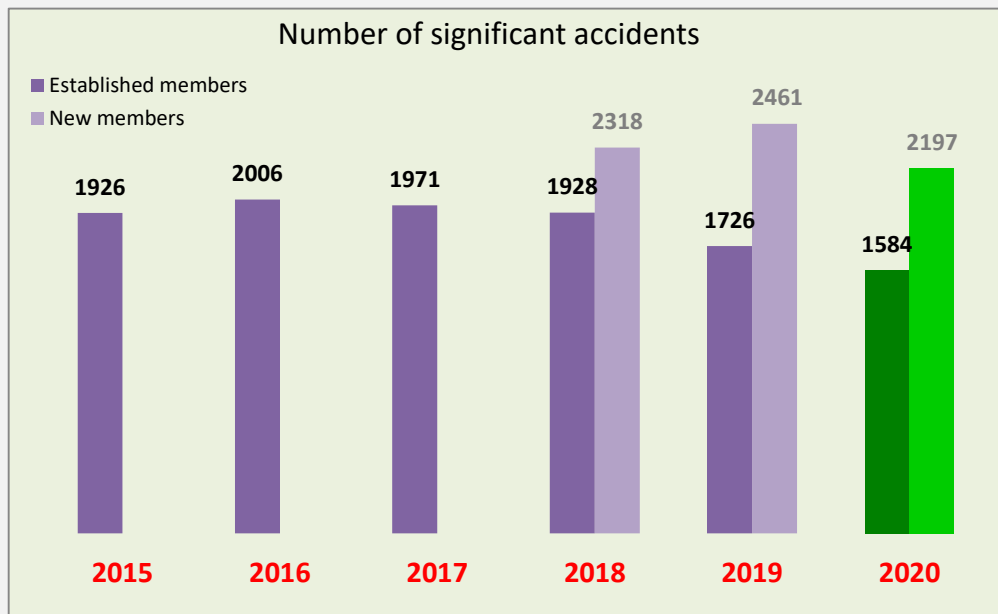
Bart Hoogcarspel
Chairman of Safety Performance Group

Part 1 - General Safety Indicators for the year 2020

- 1.01 Evolution of significant accidents and UIC Safety Index
- 1.02 Types of accidents according to UIC-SDB and EU definitions
- 1.03 Main causes of accidents
- 1.04 Trend of accidents and rates on the last six years
- 1.05 Accidents by type
- 1.06 Fatalities and serious injuries by type of accident
- 1.07 Distribution of victims
- 1.08 Victims by type of accident according to Safety Directive definitions
- 1.09 Accidents by location details
- 1.10 Accidents at level crossings
- 1.11 Number of accidents and victims by type of accident
- 1.12 Passenger victims by type of accident and location
- 1.13 Staff victims by type of accident and location
- 1.14 Victims by type of traffic
- 1.15 Accidents by type and number of victims
- 1.16 UIC Safety Index
- 1.17 Accidents and victims by type of accident, causes and location

NB: the number 0 is indicated by the sign "-"

1.01 Evolution of significant accidents and UIC Safety Index

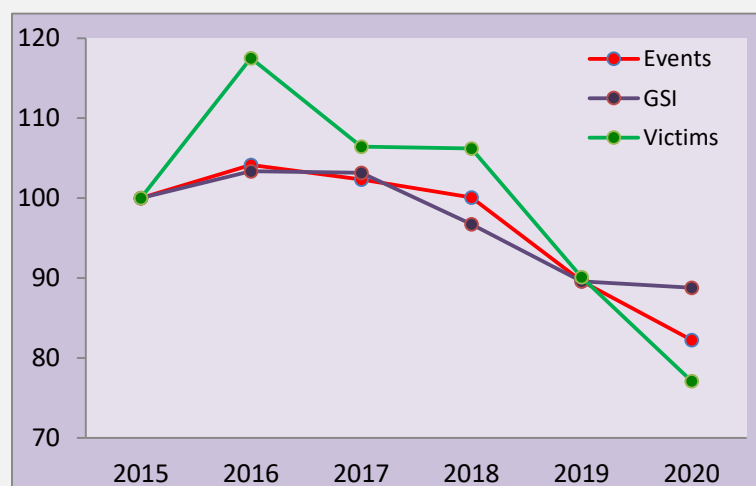


“Significant accident” means any accident involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in significant damage to stock, track, other installations or environment, or extensive disruptions to traffic, excluding accidents in workshops, warehouses and depots.

We consider as established members, railway companies that provided data on the whole six-years period. New members are listed below:

Country	Data provider	Period
Bulgaria	NRIC	2020
Lithuania	LTG	2020
Russia	JSC Russian Railways (RŽD)	2018 - 2020
Gabon	SETRAG	2018 - 2020
Ukraine	Ukrainian Railways (UŽ)	2019 - 2020

The number of events at Established members observed in 2020 a decrease of -9% compared to 2019 and -18% to the average on the period 2015-2019. The graph compares the trends of the UIC Safety Index (GSI) with the trends of number of events and number of victims (Base 100 in 2015) for Established members.



1.02 Types of accidents according to UIC-SDB and EU definitions

Types of accidents as defined in UIC – SDB	Additional information from UIC -SDB	Types of accidents as defined in EU Safety Directive
3,3%	Derailment of trains	3,3% Derailment of trains
0,7%	Train collision with another train	0,7% Train collision with another train
12,4%	Train collision with an obstacle	3,2% Train collision with an obstacle not at LC
	9,2% Train collision with an obstacle at LC	12,9% LC accidents, including accidents involving pedestrians at LC
77,9%	Individual hit by a train	
	3,8% Individual hit by a train at LC	75,4% Accidents to persons caused by rolling stock in motion, with the exception of suicides.
	74,2% Individual hit by a train not at LC	
1,2%	Individual falling from a train	
0,4%	Fire in rolling stock	0,4% Fire in rolling stock
0,3%	Electrocution by overhead line or third rail	4,1% Other types of accidents
0,0%	Accident involving dangerous goods	
3,6%	Shunting operations	
0,1%	Runaway vehicles	

- 80% of accidents involved individuals hit by a train or falling from a train.
- Collision with an obstacle was the second most common accident (12% of all accidents).
- Accidents at level crossings accounted for 13% of all significant accidents.
- Accidents during shunting operations and involving runaway vehicles are separated to better fit with the EU definitions.
- Accidents at level crossings are separated in the UIC database between collisions with an obstacle (motorized vehicle) and pedestrians (or cyclists) hit by a train.

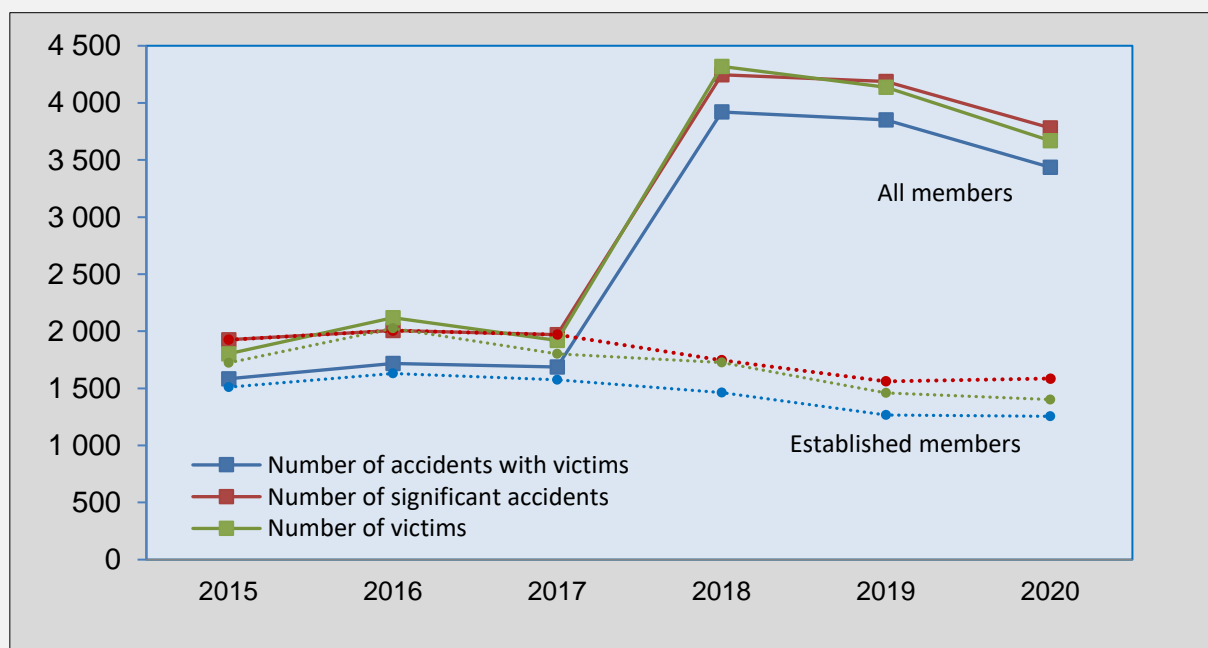
1.03 Main causes of accidents

2020	Causes at first level	Causes at second level	
EXTERNAL CAUSES	THIRD PARTIES 88,4%	Trespassing	73,2%
		Vehicle (LC accident)	9,4%
		Pedestrian (LC accident)	3,7%
		Pedestrian on public railway area	1,7%
		Other or not specified	0,4%
	WEATHER & ENVIRONMENT 1,6%	Environment	1,4%
89,9%		Weather	0,2%
INTERNAL CAUSES	INFRASTRUCTURES 1,8%	Tracks and structures	0,8%
		Energy system	0,5%
		Other or not specified	0,4%
	ROLLING STOCK 1,7%	Running gear	0,8%
		Other or not specified	0,9%
	HUMAN FACTORS (Railway staff & subcontractors) 5,0%	Track and switch maintenance staff	0,6%
		Traffic operating and signalling staff	1,3%
		Train drivers	1,2%
		Other or not specified	2,0%
	RAILWAY USERS 1,1%	Passengers	1,0%
		Other or not specified	0,2%
9,7%			
CAUSES NOT IDENTIFIED			0,4%

- External causes are responsible for 90% of accidents.
- Internal causes relate to both the infrastructure manager and railway undertakings.

1.04 Trend of accidents and rates on the last six years

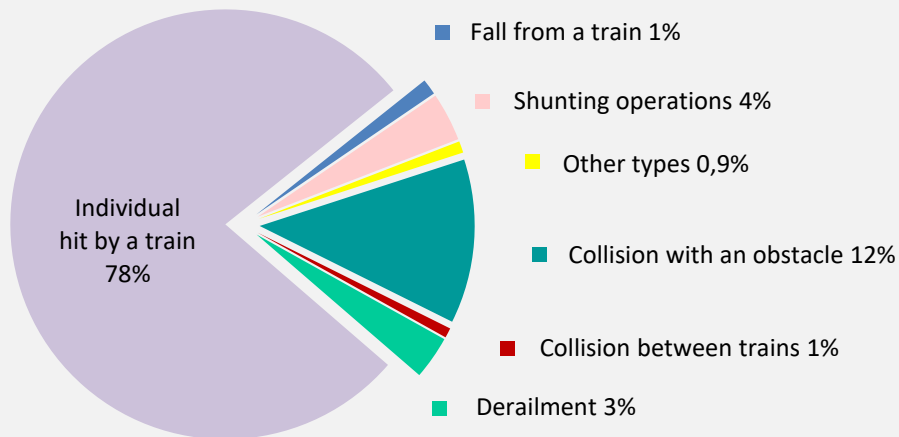
ALL RAILWAYS	2015	2016	2017	2018	2019	2020
Number of significant accidents	1 926	2 006	1 971	4 246	4 187	3 781
Significant accidents per million train-km	0,42	0,43	0,42	0,66	0,63	0,62
Number of accidents with victims	1 584	1 718	1 688	3 920	3 851	3 435
Accidents with victims per million train-km	0,35	0,37	0,36	0,61	0,58	0,56
Number of victims	1 803	2 119	1 919	4 319	4 137	3 670
Victims per million train-km	0,39	0,46	0,41	0,67	0,62	0,60
Number of fatalities	1 029	1 181	1 086	2 687	2 608	2 329
Fatalities per million train-km	0,22	0,26	0,23	0,42	0,39	0,38
Number of million train-kilometres	4 580	4 617	4 731	6 399	6 631	6 122



The increases observed in 2018 are linked to the incorporation of important new members into the UIC Safety Database.

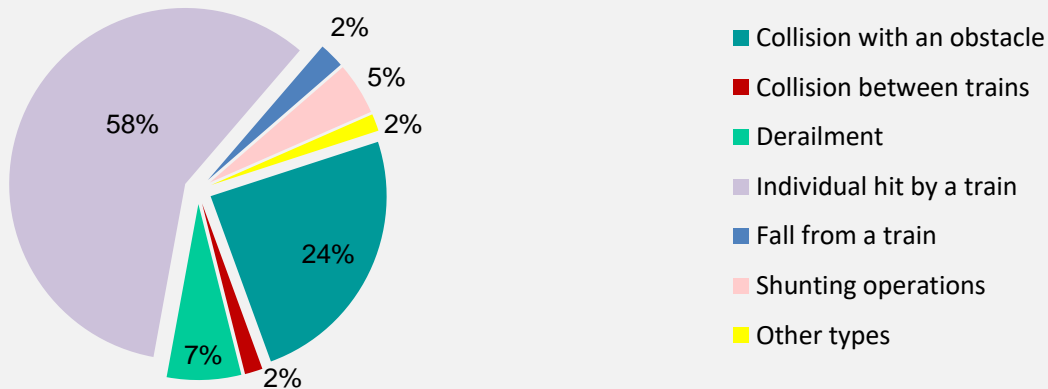
1.05 Accidents by type

2020

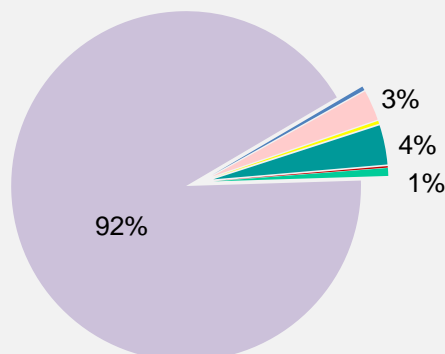


- "Collision with an obstacle" includes collisions at LC.
- "Individual hit by a train" includes pedestrians at LC.
- "Other types": electrocutions, fires in rolling stock, dangerous goods and runaway vehicles
- For LC accidents, refer to graph 1.10.

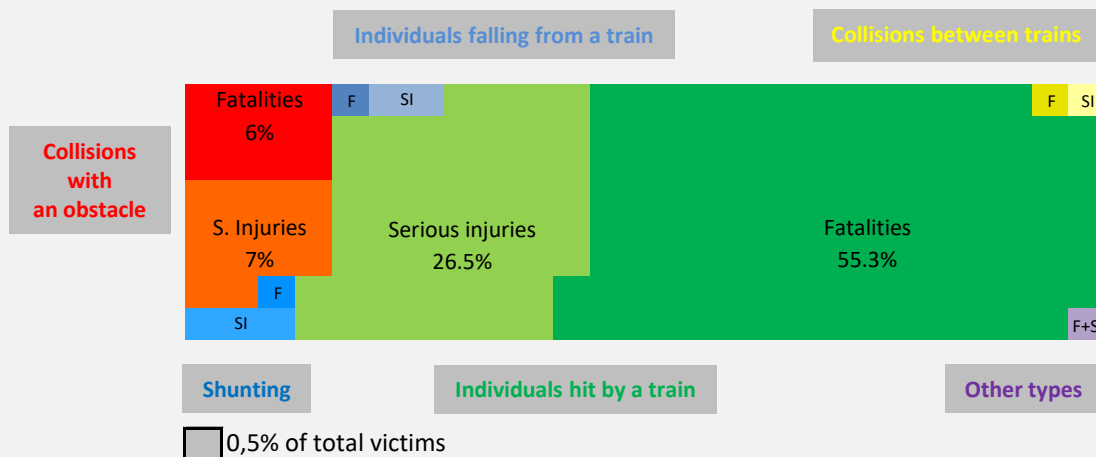
Established members



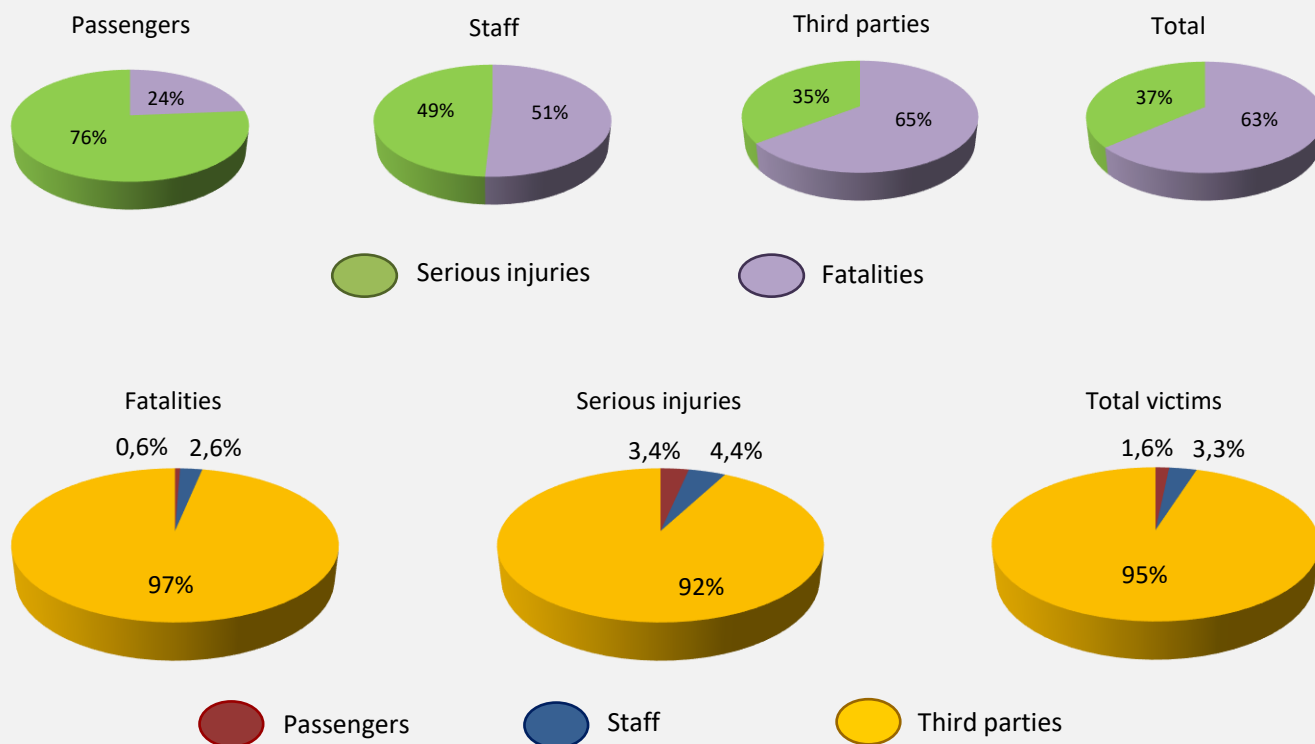
New members



1.06 Fatalities and serious injuries by type of accident



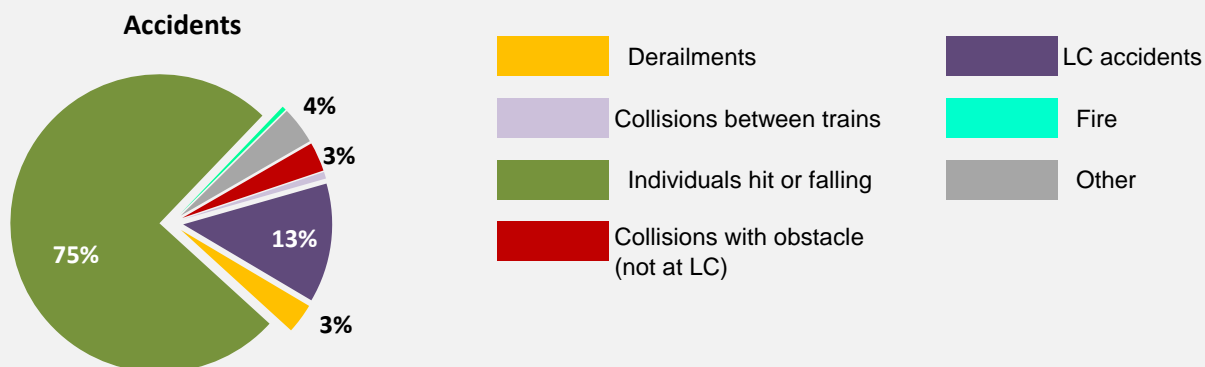
1.07 Distribution of victims



Reading method: fatalities account for 25% of passenger victims and passengers represent 0,6% of fatalities.

- Third parties represented 97% of all fatalities and 92% of serious injuries.
- Fatalities accounted for 63% of victims.

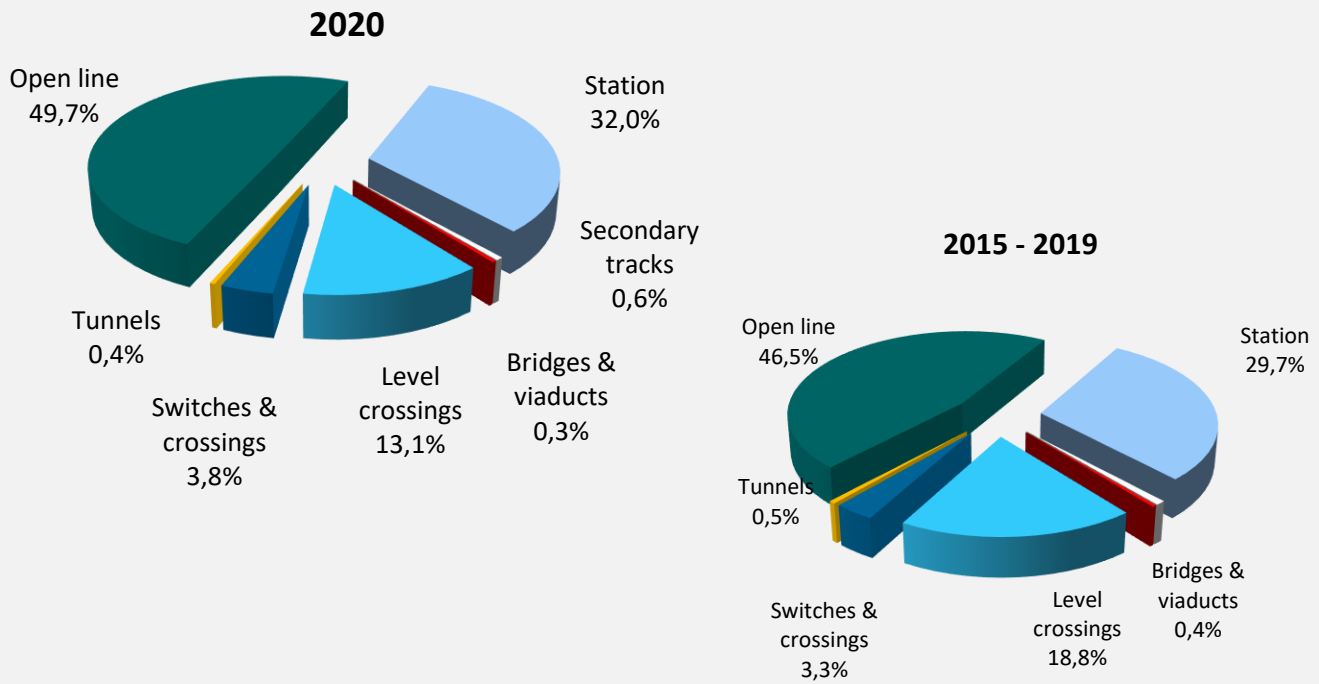
1.08 Victims by type of accident according to Safety Directive definitions



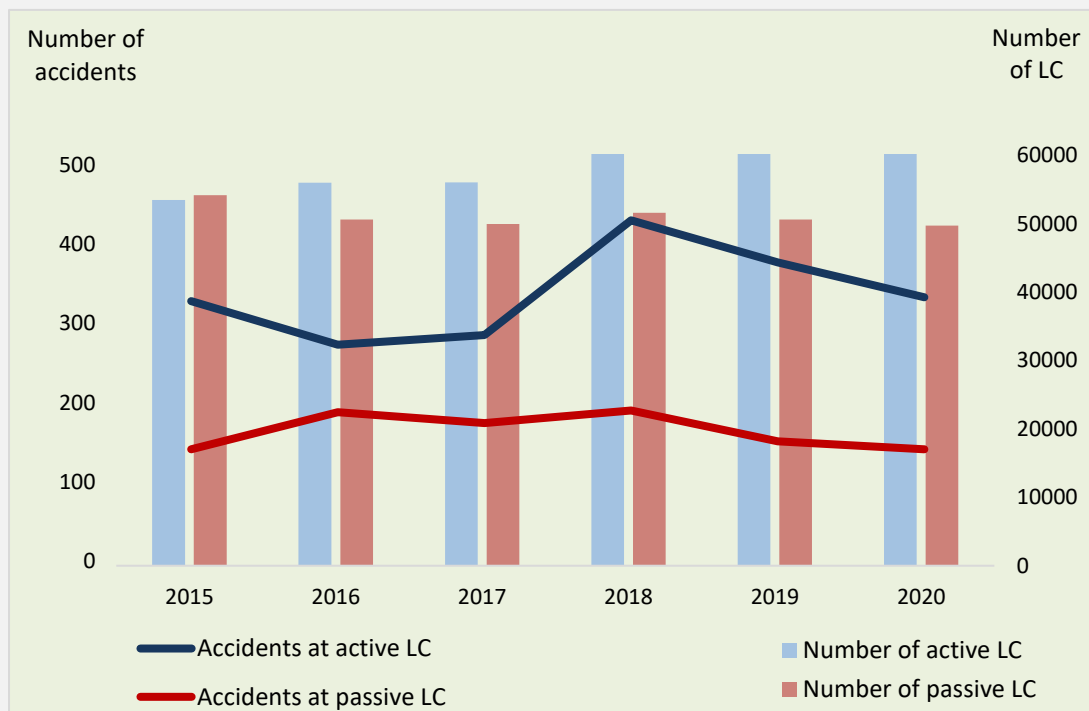
Breakdown of human consequences			
	Fatal.	Injur.	All
Passengers	0,4%	1,2%	2%
Staff	1,7%	1,6%	3%
Third parties	61,4%	33,7%	95%
All categories	63%	37%	100%

Type of accident	Number of events	%	Fatalities			Serious injuries		
			Passengers	Staff	3rd parties	Passengers	Staff	3rd parties
Collisions with obstacle (not at LC)	120	3,2%	1	7	5	1	8	4
Collisions between trains	28	0,7%	2	17	-	12	8	-
Level crossings	489	12,9%	-	1	309	3	5	268
Derailment	123	3,3%	-	3	-	1	3	-
Individuals & rolling stock in motion (not at LC)	2 850	75,4%	10	31	1909	28	16	920
Fire	17	0,4%	1	-	-	-	-	-
Other types	154	4,1%	-	2	31	-	19	45
Total	3 781		14	61	2 254	45	59	1 237

1.09 Accidents by location details



1.10 Accidents at level crossings



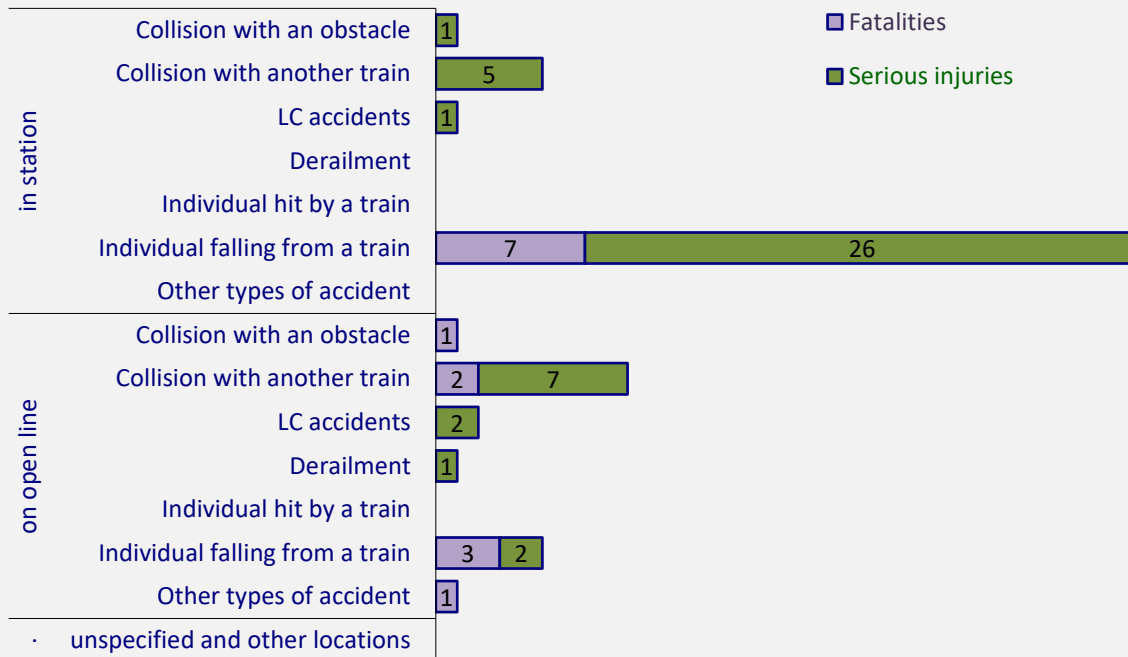
This graph excludes Canada (split between passive and active level crossings unavailable). The increase in 2018 both in active LC and accidents at active LC is due to the inclusion of new members. From 2018 to 2020, the number of accidents at active LC decreased 23% and the number of accidents at passive LC decreased 26%.

1.11 Number of accidents and victims by type of accident

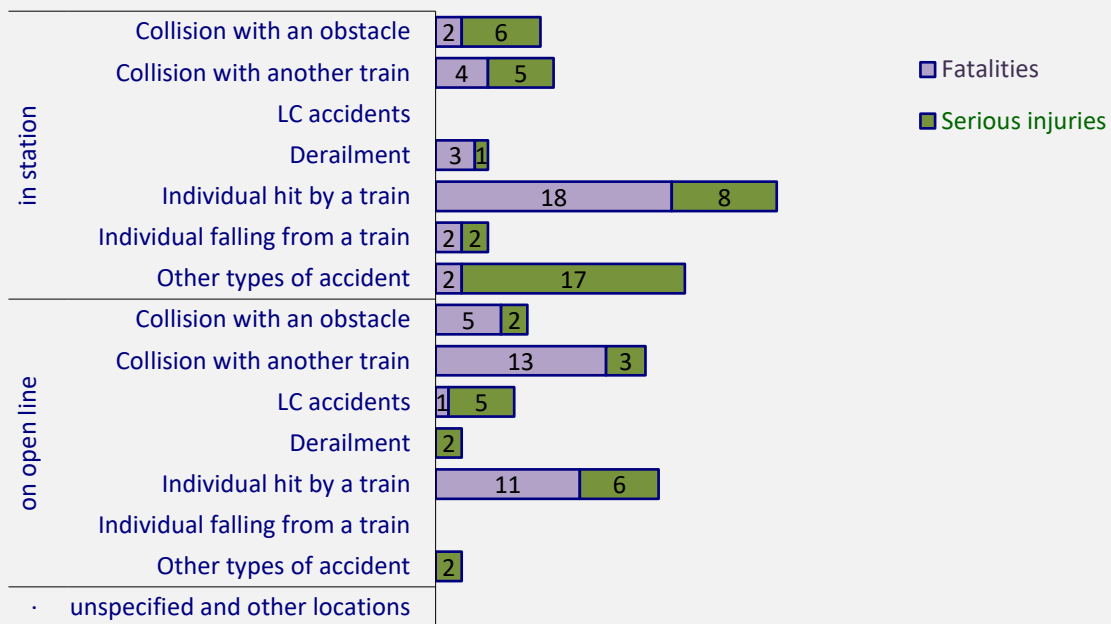
2020		Number of accidents	FATALITIES			SERIOUS INJURIES			ALL VICTIMS
			Passengers	Staff	3rd parties	Passengers	Staff	3rd parties	
At station	Collisions with an obstacle (not at LC)	26	-	2	1	1	6	-	10
	Collisions between trains	15	-	4	-	5	5	-	14
	LC accidents	91	-	-	56	1	-	45	102
	Derailments	56	-	3	-	-	1	-	4
	Hit by a train (not at LC)	1091	-	18	678	-	8	405	1109
	Falling from a train	39	7	2	2	26	2	1	40
	Other accidents	131	-	2	20	-	17	31	70
	Total at station	1449	7	31	757	33	39	482	1349
On open line	Collisions with an obstacle (not at LC)	94	1	5	4	-	2	4	16
	Collisions between trains	13	2	13	-	7	3	-	25
	LC accidents	398	-	1	253	2	5	223	484
	Derailments	67	-	-	-	1	2	-	3
	Hit by a train (not at LC)	1714	-	11	1229	-	6	513	1759
	Falling from a train	6	3	-	-	2	-	1	6
	Other accidents	40	1	-	11	-	2	14	28
	Total in open line	2332	7	30	1497	12	20	755	2321
not specified		-	-	-	-	-	-	-	-
GRAND TOTAL		3781	14	61	2254	45	59	1237	3670

- 62% of accidents occurred on open line, whilst 38% happened in stations and yards.
- 66% of fatalities occurred on open line.
- Persons hit by a train and LC accidents represented 96% of all fatalities.

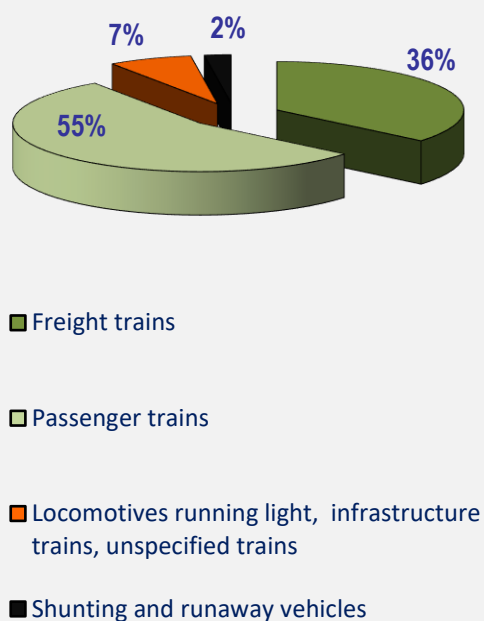
1.12 Passenger victims by type of accident and location



1.13 Staff victims by type of accident and location

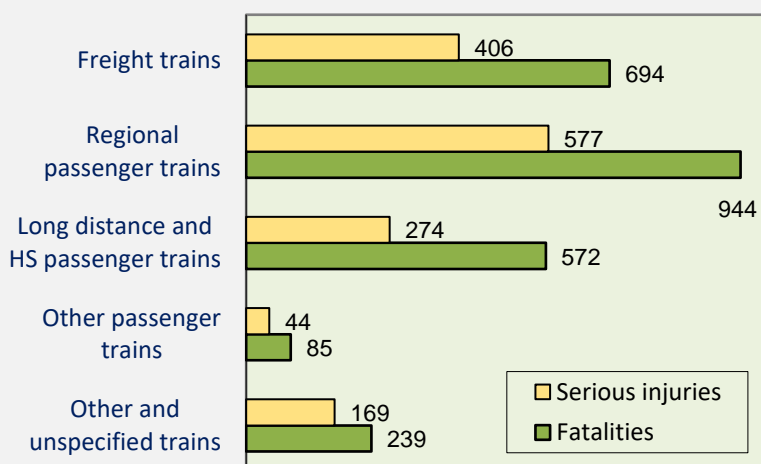


1.14 Victims by type of traffic

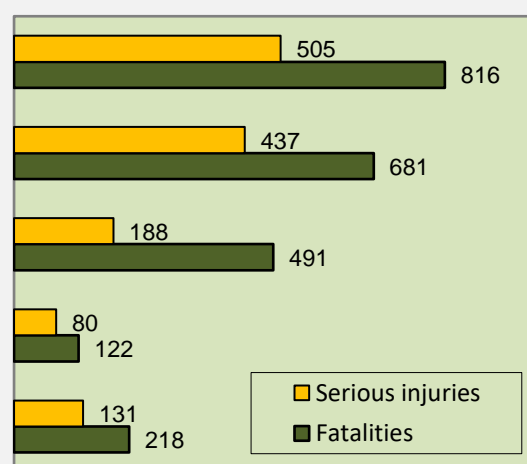


Type of accident	Freight trains	Passenger trains	Locomotives running light, infrastructure trains, unspecified trains	Shunting and runaway vehicles
Collision	24	35	6	4
Derailment	3	4	-	1
Level-crossing accidents	187	372	26	8
Accidents to persons caused by rolling stock in motion	1102	1579	233	70
Other accidents	5	9	-	1
TOTAL victims	1321	1999	265	84

2019



2020

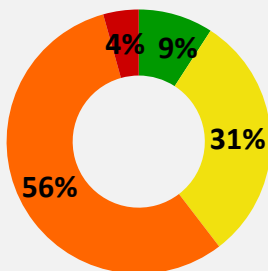


Among accidents where the type of train is registered, freight trains are involved in accidents leading to 40% of victims and regional passenger trains to 34%.

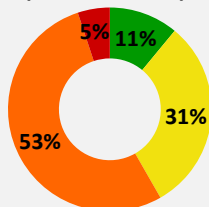
Due to lockdowns and other mobility restrictions, less passenger trains were running during 2020. This led logically to a drop of accidents involving passenger trains, unfortunately partly compensated by the increase of accidents involving freight trains.

1.15 Accidents by type and number of victims

**All accidents 2020
(3782 events)**

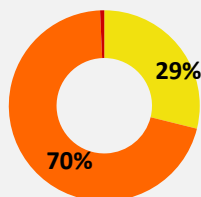


**2015 - 2019
(14336 events)**

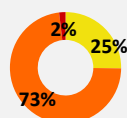


* a victim is a fatality or a serious injury

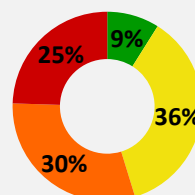
**Individual hit by a train at
LC 2020
(139 events)**



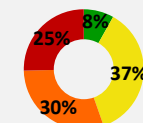
**2015 - 2019
(921 events)**



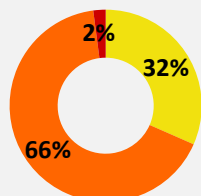
**Collision with an obstacle
at LC 2020
(346 events)**



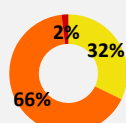
**2015 - 2019
(1747 events)**



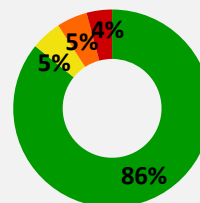
**Individual hit by a train
not at LC 2020
(2808 events)**



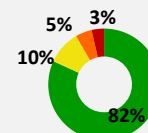
**2015 - 2019
(9428 events)**



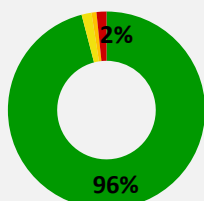
**Collision with an obstacle
not at LC 2020 (120 events)**



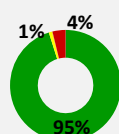
**2015 - 2019
(611 events)**



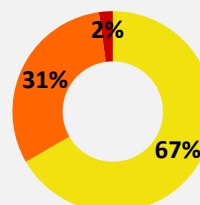
**Derailment 2020
(123 events)**



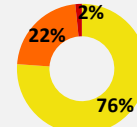
**2015 - 2019
(554 events)**



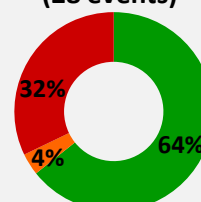
**Fall from a train 2020
(45 events)**



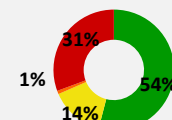
**2015 - 2019
(311 events)**



**Collision between trains
2020
(28 events)**

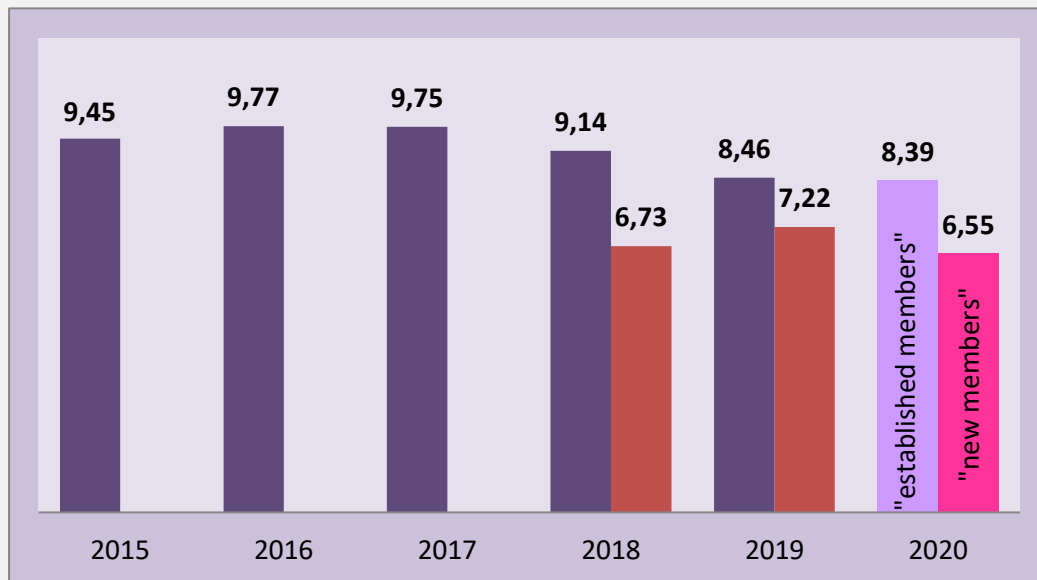


**2015 - 2019
(112 events)**



- Fires in RS: 15 events (1 serious injury)
- Electrocutions: 6 events (7 fatalities)

1.16 UIC Safety Index



The UIC Safety Index was created in 2015 by the Safety performance Group. It reflects more aspects than the sole number of events. Each event is weighted following the type of accident, the category of victim, the number of victims and the cause.

The exact calculation behind the UIC Safety Index is available at UIC.



1.17 Accidents and victims by type of accident, causes and location

Type of accidents	Causes			Location				Victims Fatal. S. Inj.				
				Type of location		Location details						
Individual hit by a train 2947 3012	INF	-	-	OL	1813	1860	LC	142	144	P	-	-
	RS	1	1				SC	53	54			
	HF	38	41	S	1134	1152	BV	11	12	S	29	14
	RU	1	1				T	7	8			
	WE	-	-	Ot	-	-	O	2731	2791	T	2008	961
	TP	2906	2966									
	Train collision with an obstacle 467 468	INF	29	4	OL	393	399	LC	347	442	P	1
RS		10	1	SC				7	1			
HF		18	8	S	74	69	BV	-	-	S	8	13
RU		-	-				T	5	-			
WE		53	4	Ot	-	-	O	107	25	T	213	229
TP		357	451									
Individual falling from a train 45 46		INF	-	-	OL	6	6	LC	-	-	P	10
	RS	-	-	SC				-	-			
	HF	5	5	S	39	40	BV	-	-	S	2	2
	RU	36	37				T	-	-			
	WE	-	-	Ot	-	-	O	44	45	T	2	2
	TP	4	4									
	Train collision with another train 28 39	INF	1	-	OL	13	25	LC	-	-	P	2
RS		-	-	SC				5	9			
HF		25	39	S	15	14	BV	-	-	S	17	8
RU		-	-				T	-	-			
WE		-	-	Ot	-	-	O	18	30	T	-	-
TP		-	-									
Derailment 123 7		INF	35	2	OL	67	3	LC	-	-	P	-
	RS	37	-	SC				40	2			
	HF	34	4	S	56	4	BV	2	-	S	3	3
	RU	3	-				T	1	-			
	WE	6	-	Ot	-	-	O	76	5	T	-	-
	TP	1	-									
	Electrocution 13 13	INF	-	-	OL	4	4	LC	-	-	P	-
RS		1	1	SC				-	-			
HF		2	2	S	9	9	BV	-	-	S	-	2
RU		-	-				T	-	-			
WE		-	-	Ot	-	-	O	11	11	T	8	3
TP		10	10									
Fires 17 1		INF	1	1	OL	12	1	LC	-	-	P	1
	RS	12	-	SC				-	-			
	HF	2	-	S	5	-	BV	-	-	S	-	-
	RU	-	-				T	1	-			
	WE	-	-	Ot	-	-	O	16	1	T	-	-
	TP	-	-									

Type of accidents	Causes			Location				Victims		
				Type of location		Location details		Fatal.	S.	Inj.
Accident involving dangerous goods without release - -	INF	-	-	OL	-	-	LC	-	-	-
	RS	-	-				SC	-	-	-
	HF	-	-	S	-	-	BV	-	-	-
	RU	-	-				T	-	-	-
	WE	-	-	Ot	-	-	O	-	-	-
	TP	-	-							
Accident involving dangerous goods with release 1 -	INF	-	-	OL	-	-	LC	-	-	-
	RS	1	-				SC	-	-	-
	HF	-	-	S	1	-	BV	-	-	-
	RU	-	-				T	-	-	-
	WE	-	-	Ot	-	-	O	1	-	-
	TP	-	-							
Shunting operations 138 83	INF	3	-	OL	23	22	LC	8	8	-
	RS	1	-				SC	40	6	-
	HF	66	15	S	115	61	BV	-	-	-
	RU	1	1				T	-	-	-
	WE	-	-	Ot	-	-	O	85	67	-
	TP	63	66							
Runaway vehicles 2 1	INF	-	-	OL	1	1	LC	-	-	-
	RS	1	1				SC	-	-	-
	HF	-	-	S	1	-	BV	-	-	-
	RU	1	-				T	-	-	1
	WE	-	-	Ot	-	-	O	2	1	-
	TP	-	-							

TOTAL	INF	69	7	OL	2332	2321	LC	497	594	P	14	45
	RS	64	4				SC	145	72			
	HF	190	114	S	1449	1349	BV	13	12	S	61	59
	RU	42	39				T	14	8			
	WE	59	4	Ot	-	-	O	3091	2976	T	2254	1237
	TP	3341	3497									
											2329	1341

number of accidents	INF: Infrastructures	OL: Open line S: At station Ot: Other locations	LC: Level crossings SC: Switches & Crossings BV: Bridges & Viaducts T: Tunnels O: Other or unidentified	P: passengers S: Staff T: Third parties
	RS: Rolling stock			
	HF: Human Factors			
	RU: Railway users			
	WE: Weather-Environment			
number of victims	TP: Third Parties			

Part 2
Time series and trends 2015-2020

Part 2 - Time series and trends 2015-2020

excluding Russia, Ukraine, Gabon, Lithuania and Bulgaria
(full time series unavailable)

CAUSES

2.01 Significant accidents

2.02 Causes

2.03 Internal causes

2.04 External causes

2.05 Third parties

HUMAN CONSEQUENCES

2.06 Human consequences

2.07 Severe accidents (two and more victims)

2.08 Passengers

2.09 Staff

2.10 Third parties

TYPE OF ACCIDENT

2.11 Collisions with an obstacle

2.12 Collisions between trains

2.13 Derailments

2.14 Individuals hit by a train

2.15 Individuals falling from a train

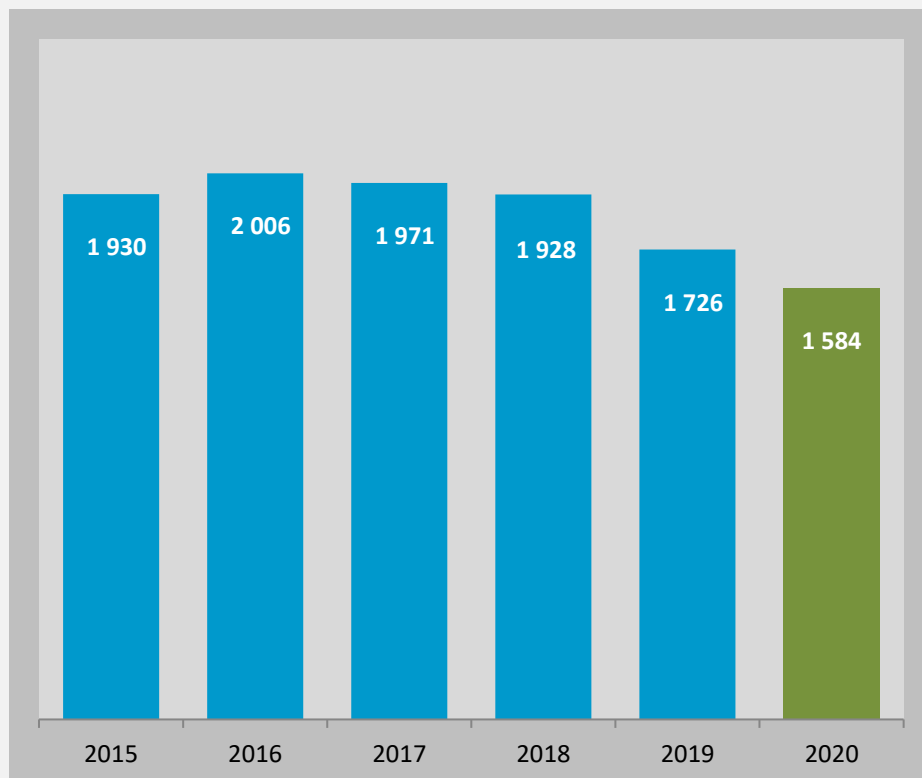
2.16 Accidents at level crossings

2.01a All significant accidents

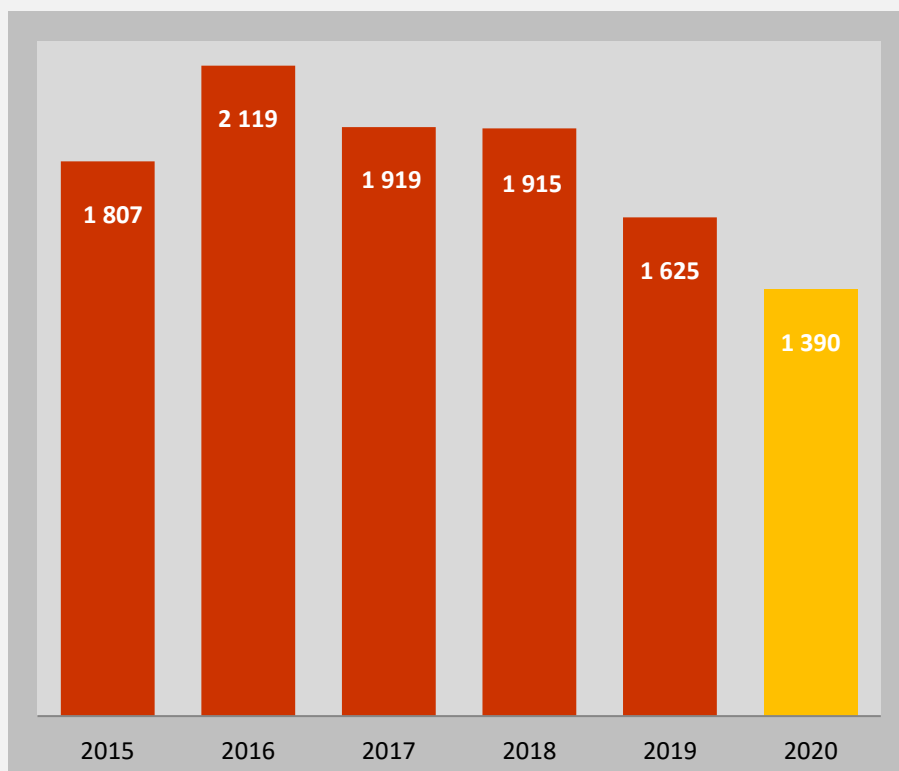
Significant accidents declared by railway members of the Safety Database dropped from 2 006 in the year 2016 to 1 584 in the year 2020, which means a decrease of -21%.

Trends are presented since 2015, in order to keep the same geographical perimeter along the years.

“Significant accident” means any accident involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in significant damage to stock, track, other installations or environment, or extensive



2.01b Victims of rail accidents



stock, track, other installations or environment, or extensive disruptions to traffic, excluding accidents in workshops, warehouses and depots.

We observe the lowest levels of victims in 2019 and 2020 since the establishment of the database in 2006.

The number of victims decreased - 33% compared to the year 2016.

The low figure obtained in 2020 (and probably in 2021) may remain exceptional, due to the COVID-19 pandemic.

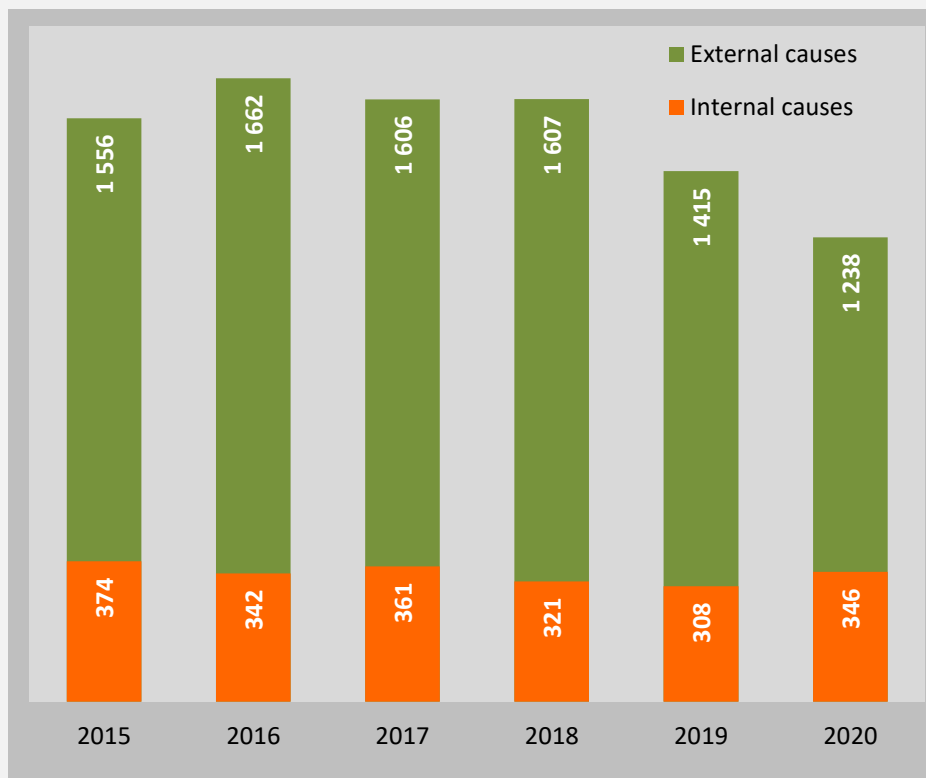
2.02a Accidents per internal / external causes

The number of accidents with internal causes decreased from 2015 to 2019, but increased in 2020.

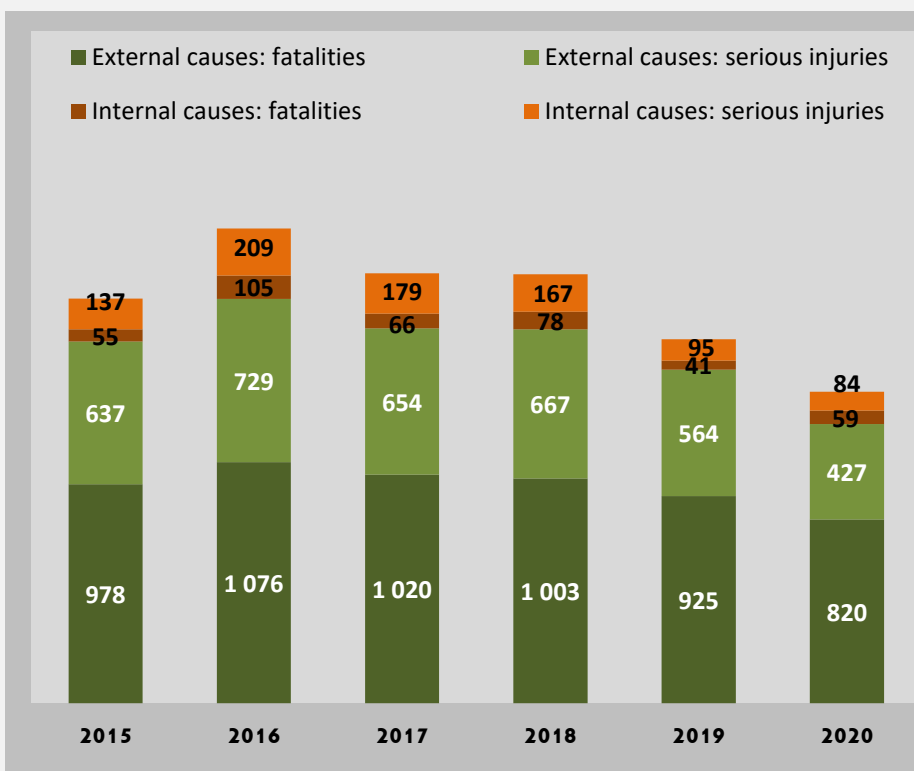
The number of accidents with external causes decreased -12% between 2018 and 2019, and again -12% between 2019 and 2020.

Reminder

- Internal causes: infrastructure, rolling stock, human factors and railway users.
- External causes: third parties, weather and environment.
- Some accidents have unidentified causes. They are excluded from the graph.



2.02b Victims per internal / external causes



External causes

The number of victims for external causes dropped by -16% between 2019 and 2020, and by -30% when compared to the peak of 2016.

Internal causes

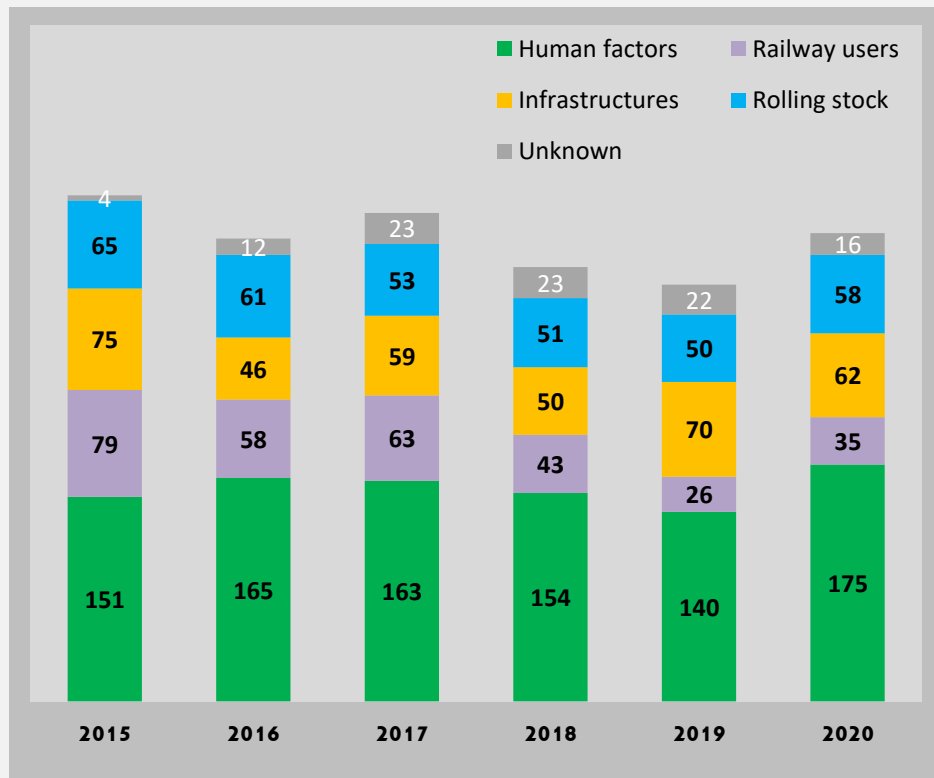
The number of victims for internal causes dropped by -7% between 2019 and 2020, and by -54% when compared to the peak of 2016.

In the year 2020:

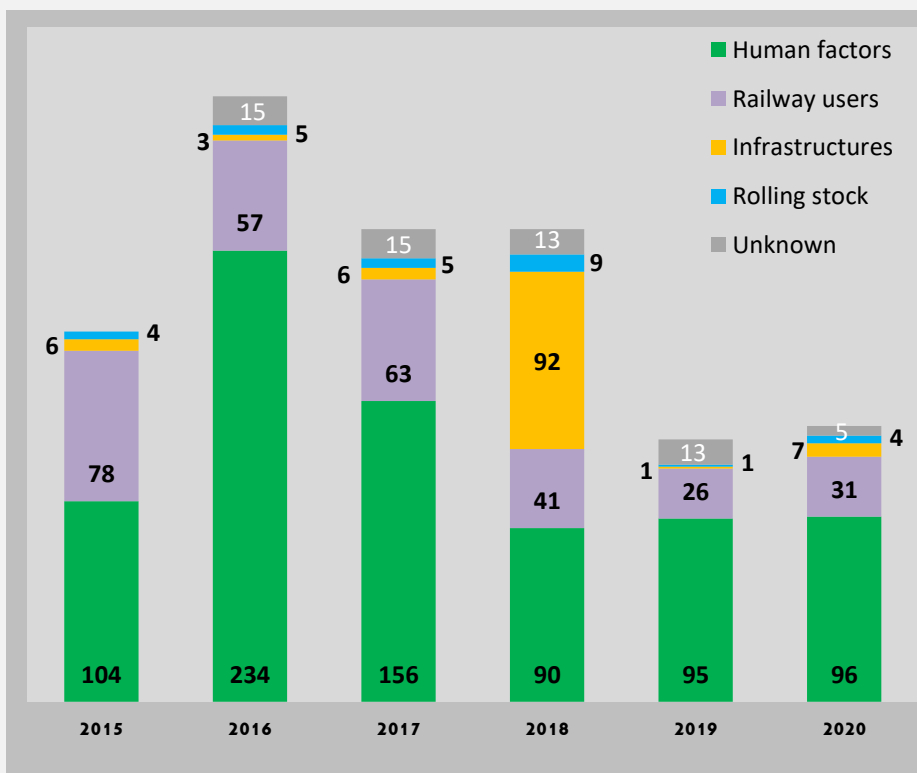
- ✓ External causes are responsible for 90% of all victims and 93% of all fatalities.
- ✓ 65% of victims of accidents with external causes are fatalities.
- ✓ 41 % of victims of accidents with internal causes are fatalities.

2.03a Accidents per internal causes

From 2019 to 2020, the number of accidents increased in three of the four subcategories (Unknown internal causes not being taken into account).



2.03b Victims per internal causes



The number of victims of accidents with internal cause fell drastically between 2018 and 2019 (-48%) but slightly increased in 2020 (+7%).

Number of accidents and number of victims are quite disconnected. A few severe accidents may have a huge number of victims (year 2016, for instance).

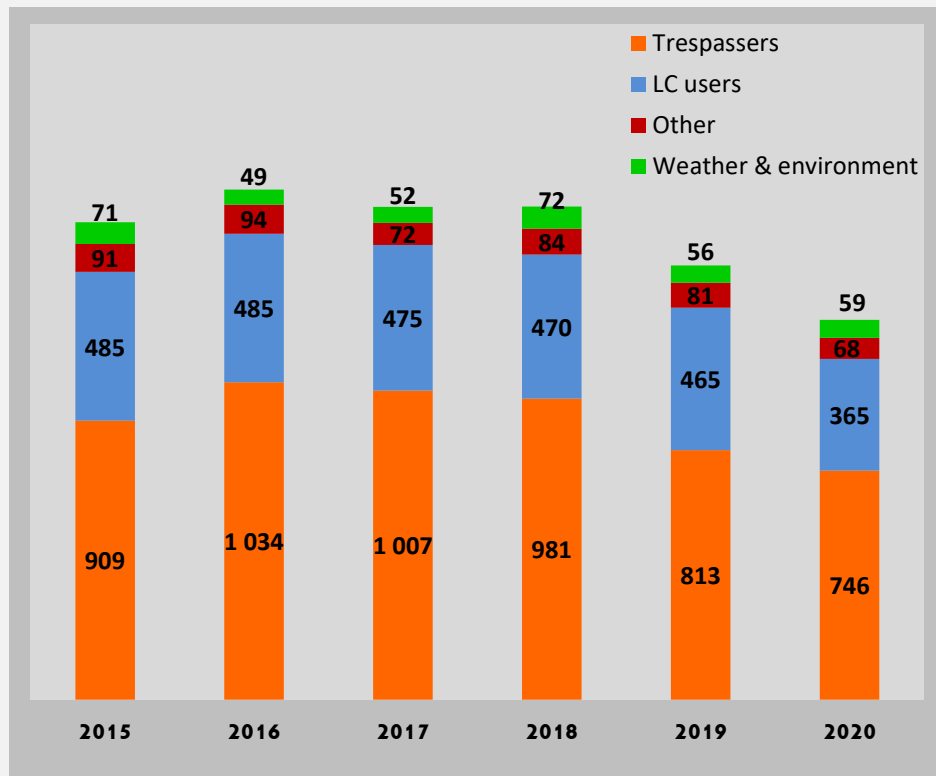
Only two accidents lead to more than 5 victims in 2019 (with respectively 6 and 7 victims). The same result was obtained in 2020 (with exactly the same numbers of victims).

2.04a Accidents per external causes

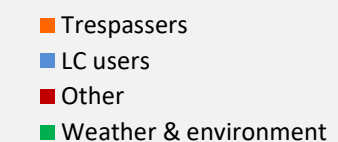
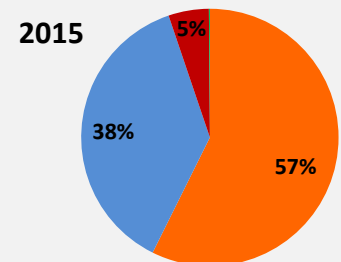
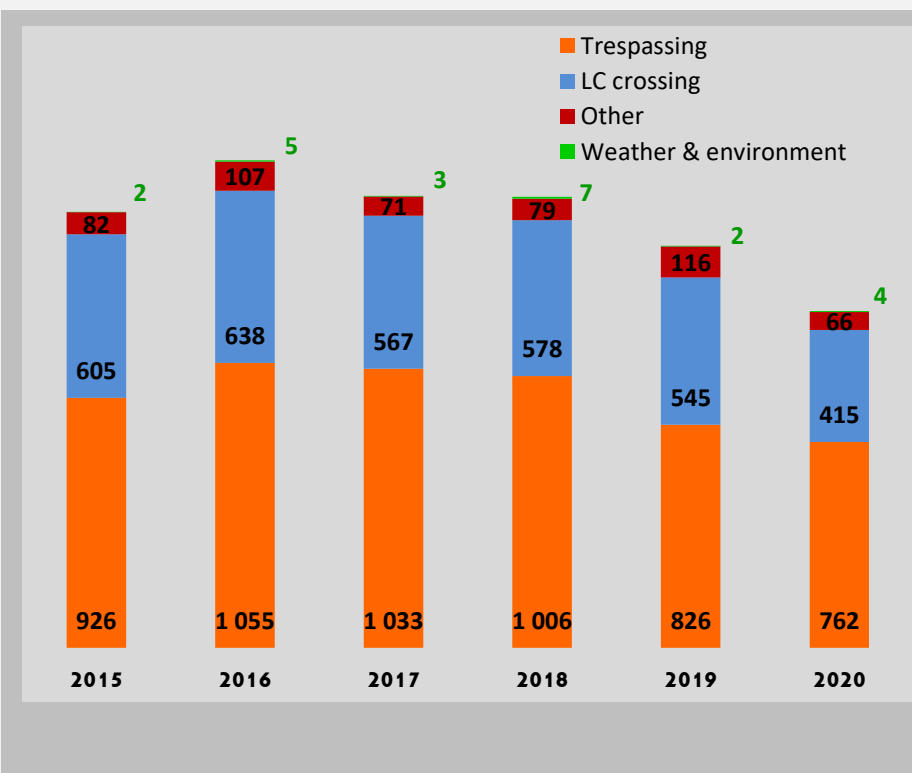
The number of accidents with external cause decreased -25% between 2016 and 2020.

Trespassers remain the most common cause of accident: 60% of all accidents with external causes in 2020.

LC users are causing 29% of all accidents with external causes in 2020. The number is relatively stable from 2015 to 2019, despite all awareness campaigns (around 475). This number dropped to 365 in 2020, due to the several lockdowns and curfews settled by authorities to fight the COVID-19 pandemic.



2.04b Victims per external causes

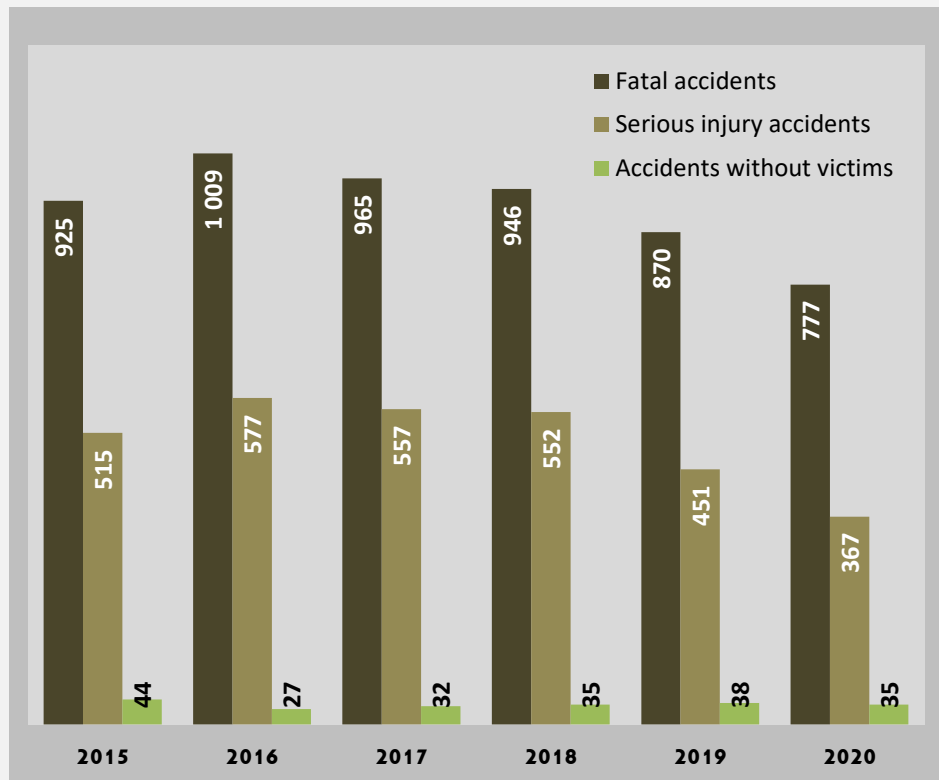


2.05a Accidents caused by third parties

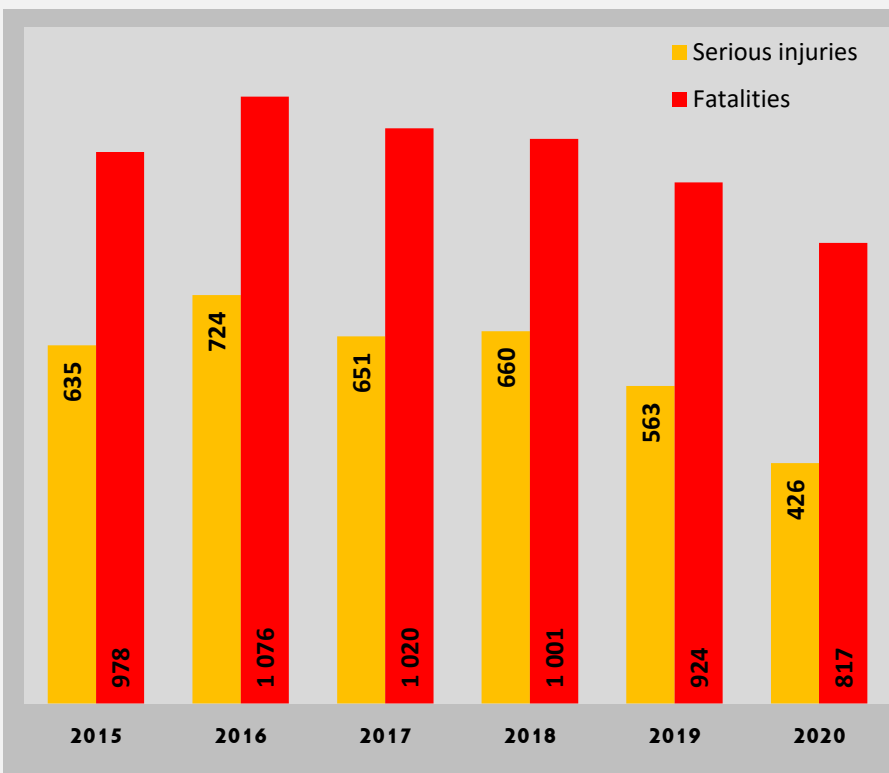
Accidents caused by third parties decreased -27% between 2016 and 2020.

94% of fatal accidents and 86% of serious injury accidents are caused by third parties (year 2020).

Accidents with serious injuries decreased -34% and fatal accidents decreased -29% since 2016



2.05b Victims of accidents caused by third parties



Compared to the peak of 2016, serious injuries decreased by - 41% and fatalities decreased by - 24%.

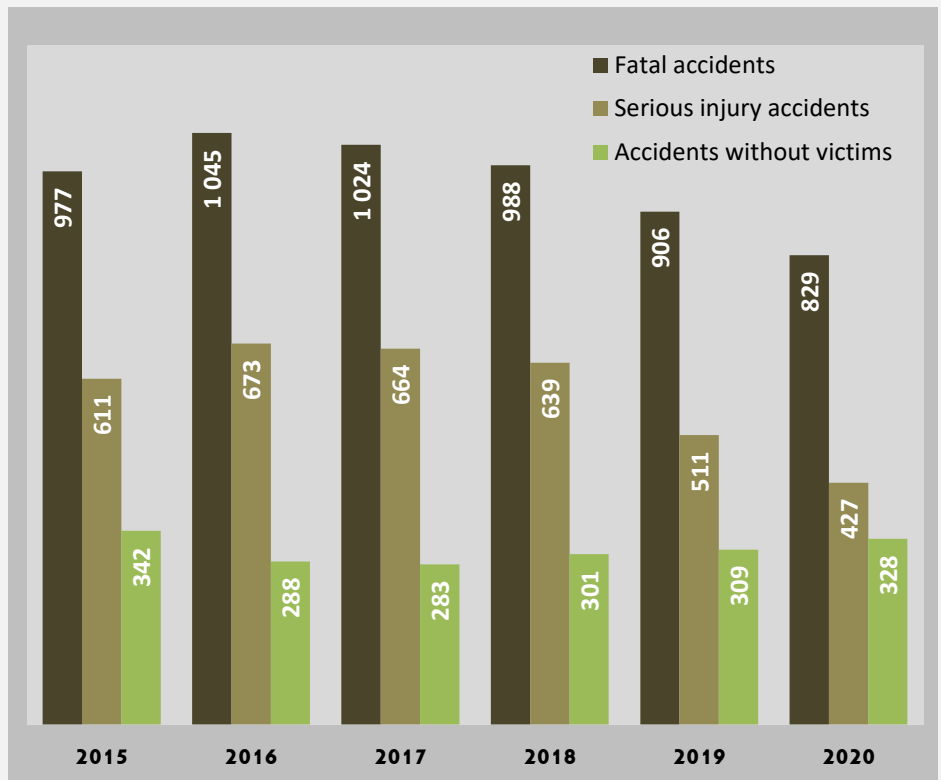
As a result the part of fatalities among the victims increased from 59,8% to 65,2%.

2.06a Accidents per human consequences

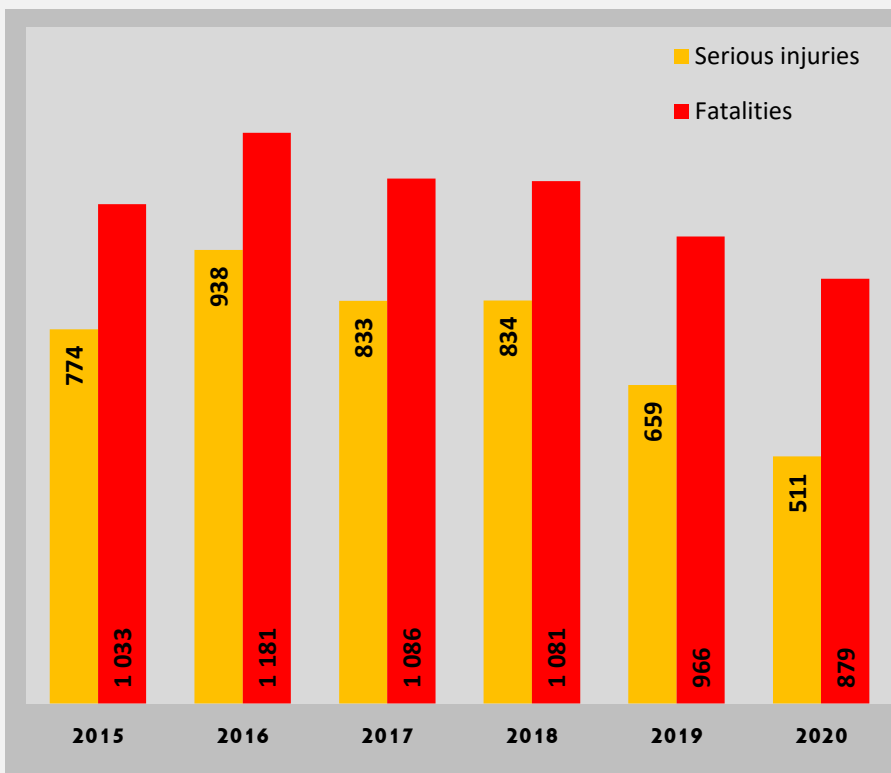
Fatal accidents represent slightly more than a half of all significant accidents. This proportion is stable along the years.

Fatal accidents decreased by -21% from 2016 to 2020 while serious injury accidents decreased by -37%.

The number of accidents without victims increases since 2017.



2.06b Fatalities and serious injuries



From 2016 to 2020, fatalities decreased -26% while serious injuries decreased -44%.

This evolution appears quite erratic as it might depend on a small number of severe accidents.

Every year, railway accidents lead to more fatalities than serious injuries, due to the preeminence of "individuals hit by a train" (see graph 2.14).

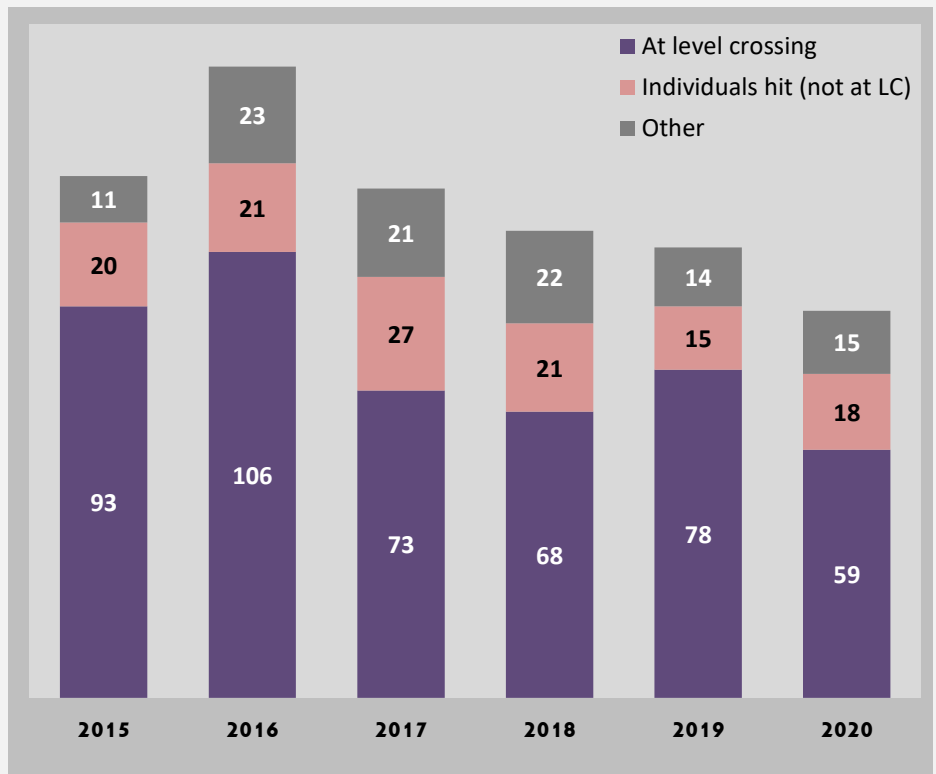
2.07a Severe accidents (two and more victims)

Severe accidents peaked in 2016. Severe accidents decreased -38% between 2016 and 2020. They represent 6% of all accidents in 2020.

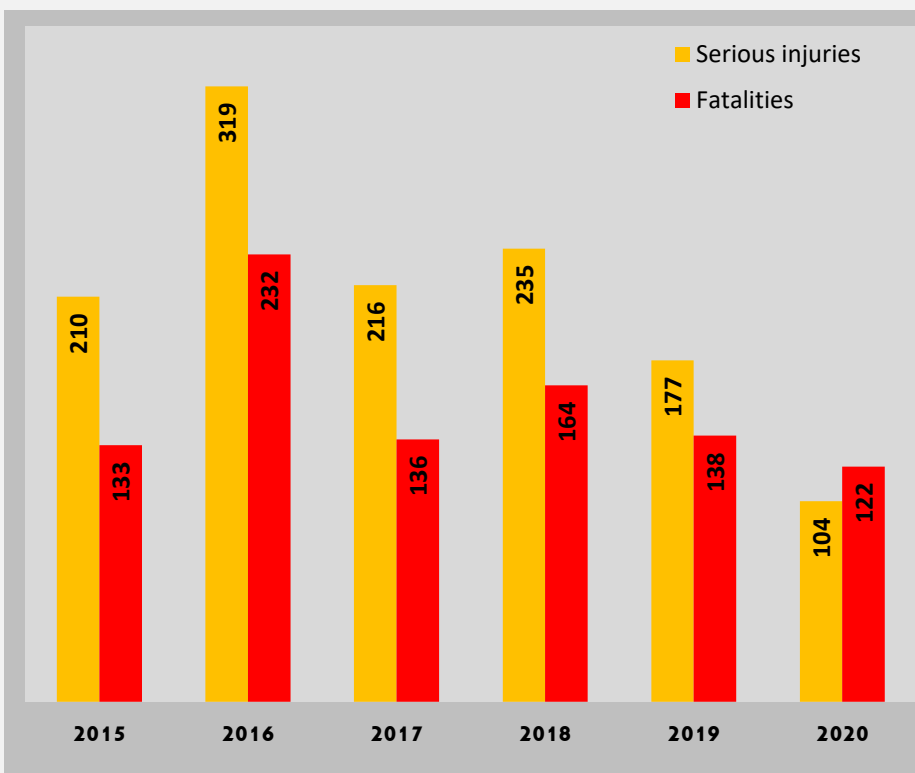
The number of collisions with road vehicles at level crossings decreased -44% on the same period.

The heaviest accidents that occurred during 2020 are:

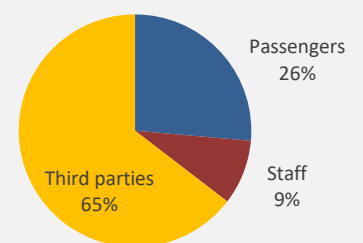
- a collision with a road vehicle outside LC (11 serious injuries)
- a collision between trains (7 victims, of which 2 fatalities)



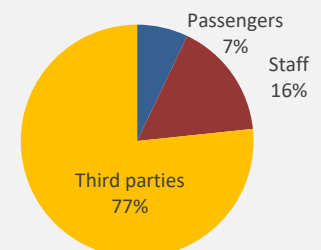
2.07b Victims of severe accidents



Split of victims 2019



Split of victims 2020



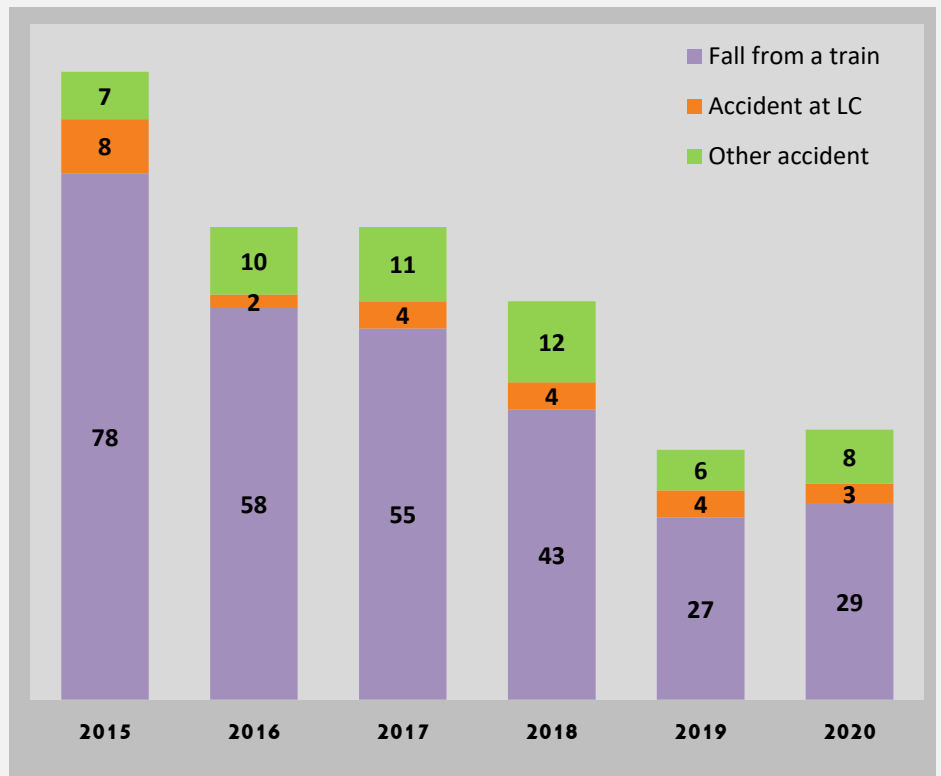
2.08a Accidents with passenger victims

The number of accidents with passenger victims decreases, since the peak of 2015. The figure obtained in 2019 (37 accidents) is the lowest observed since 2006.

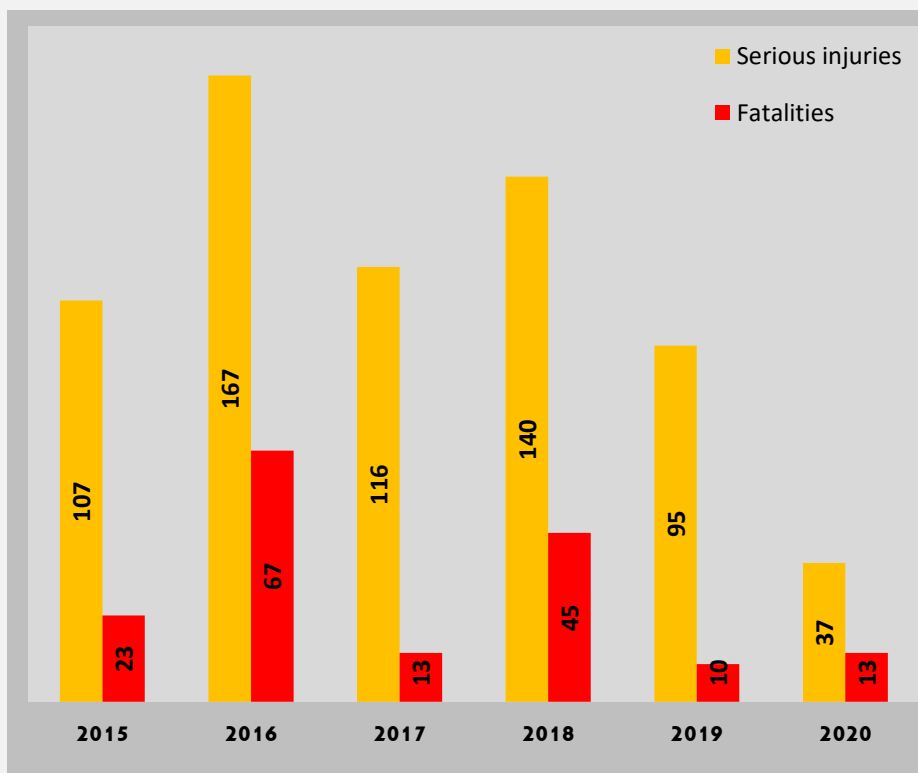
2020 shows a slight degradation as we observe three more events with passenger victims.

73% of events with passenger victims are "individuals falling from a train", representing 58% of passenger victims.

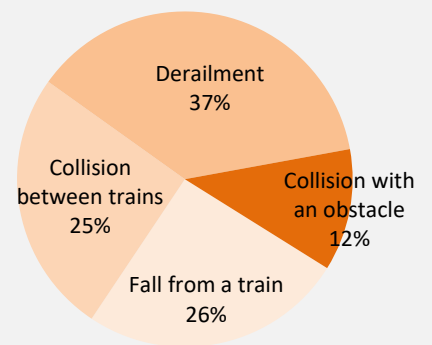
Passenger victims dropped more than a half in 2020: 50 victims against 105 victims in 2019 (see graph below).



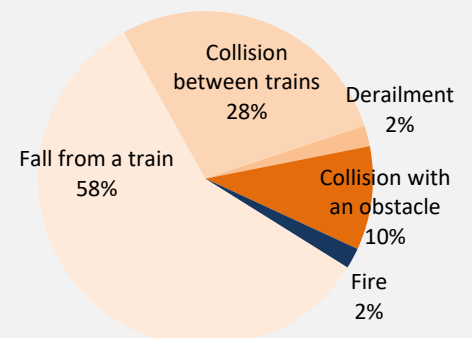
2.08b Passenger victims



Split of passenger victims in 2019



Split of passenger victims in 2020

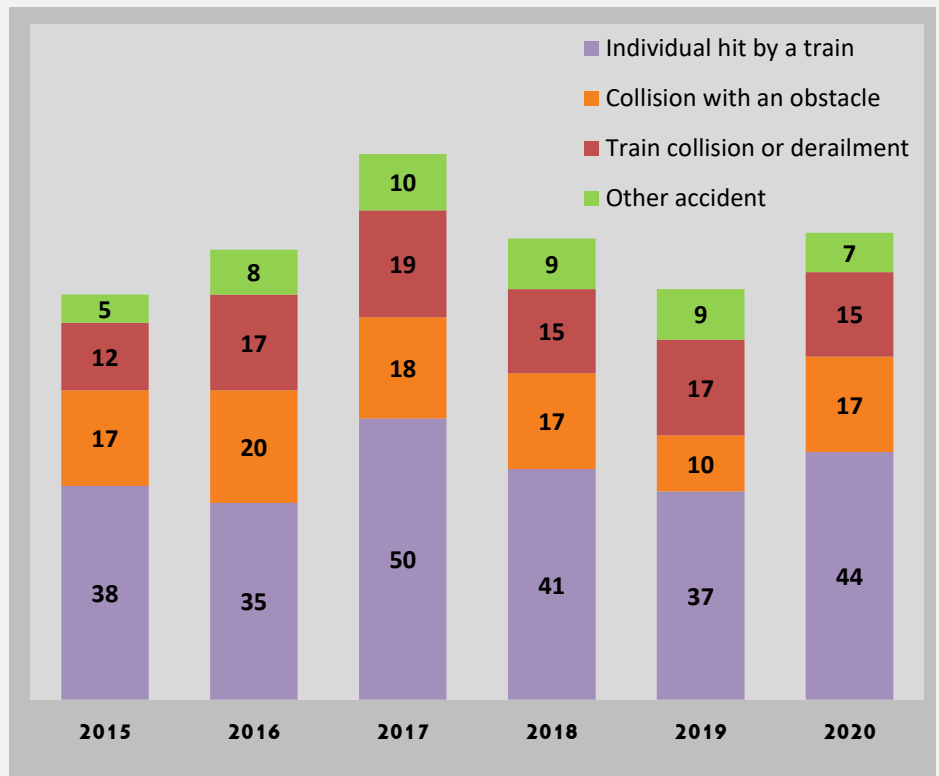


2.09a Accidents with staff victims

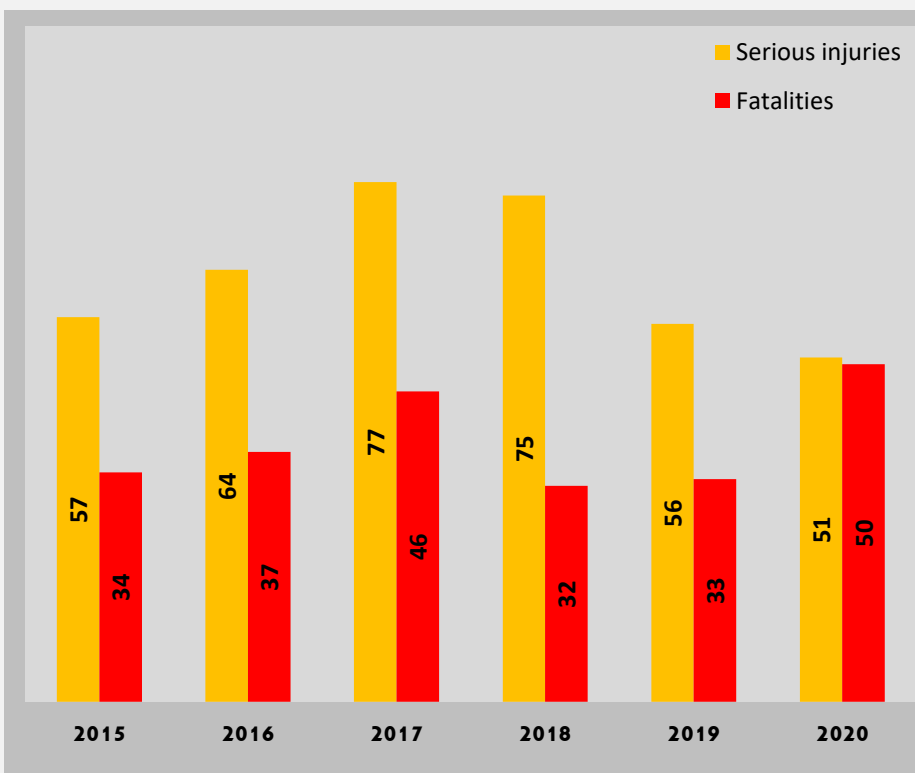
Trends are not obvious on this six-year period, but we should not forget that the number of accidents ten years ago was around 200, which means twice the present number.

Rail infrastructure staff pays the heaviest price (53% of accidents are workers hit by a train).

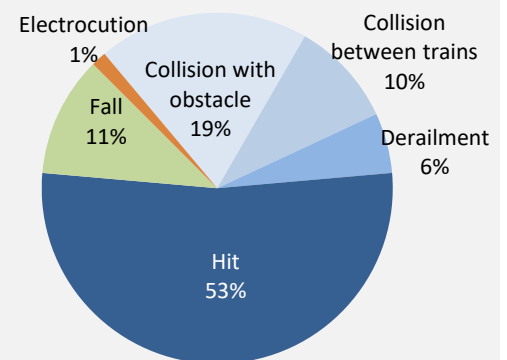
The increase of the total number of accidents with staff victims between 2019 and 2020 may be linked to the increase of accidents with human factors cause stated on page 2.03.



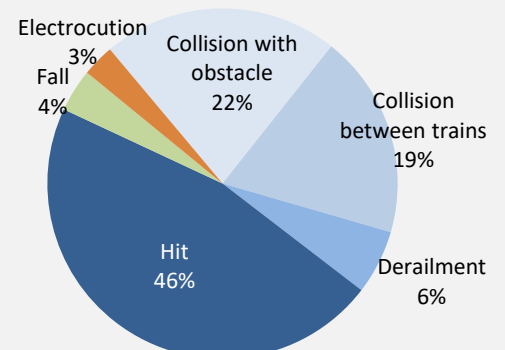
2.09b Staff victims



Split of staff victims in 2019



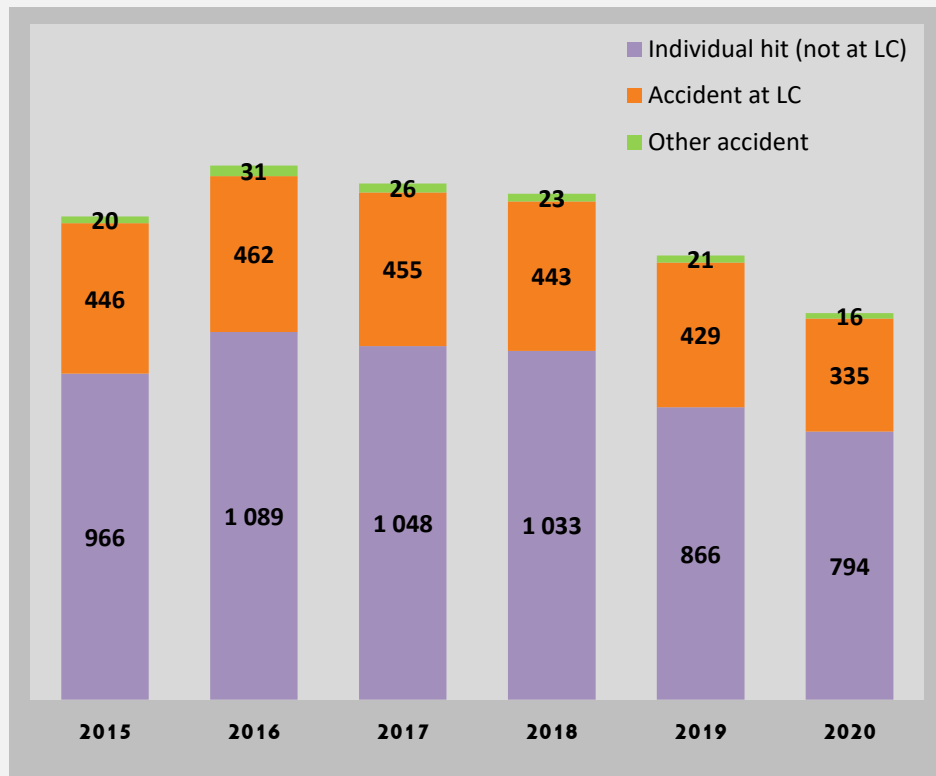
Split of staff victims in 2020



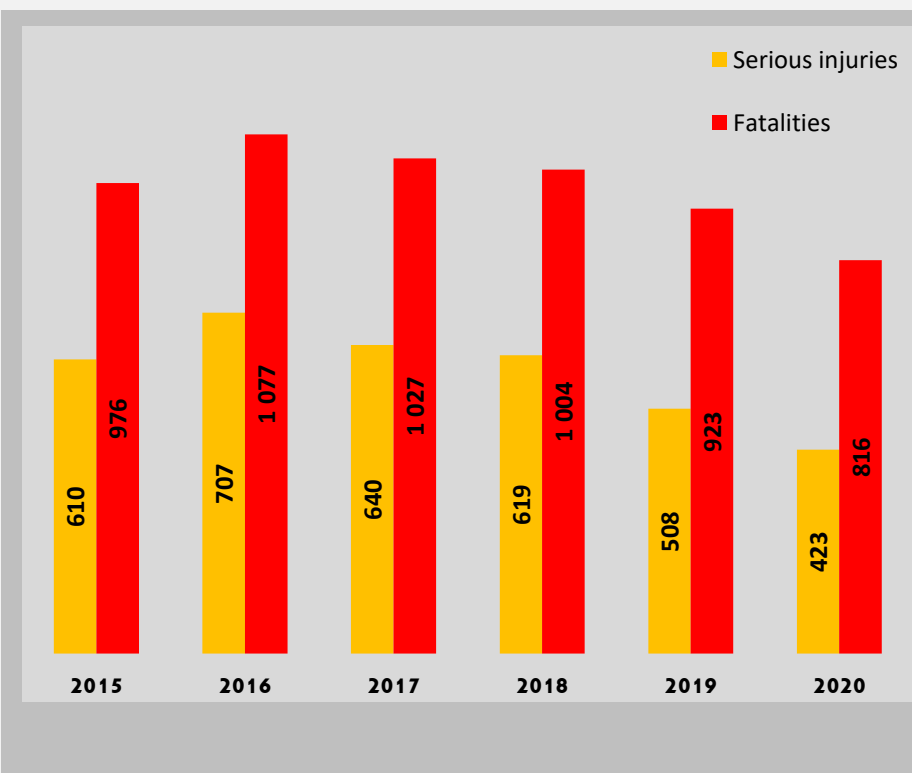
2.10a Accidents with third parties victims

The number of accidents with third parties victims decreased -28% since 2016.

The two types of accidents "Individual hit outside LC" and accident at LC" represented 98,6% of accidents with third parties victims in 2020.



2.10b Third parties victims



Fatalities decreased -24% from 2016 to 2020, whilst serious injuries decreased -39%.

Fatalities represent around 60% of all victims every year (65% in 2020).

In 2020, most victims were trespassers (62%), followed by LC users (33%) and other third parties (5%), mostly pedestrians on public railway area (platforms).

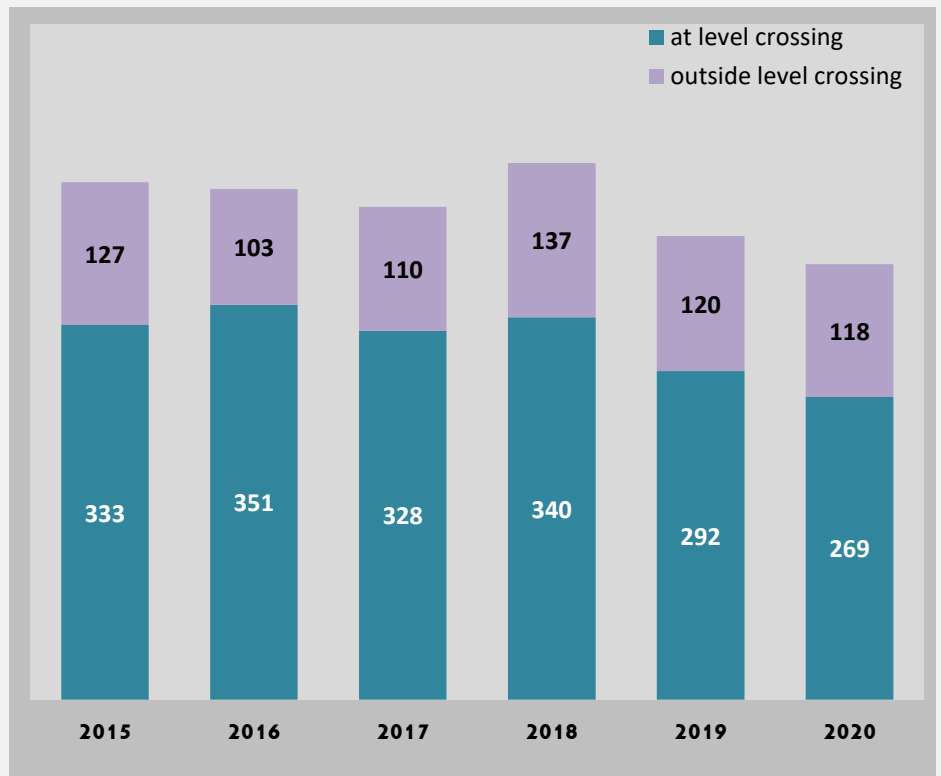
2.11a Collisions with an obstacle

This graph excludes shunting operations.

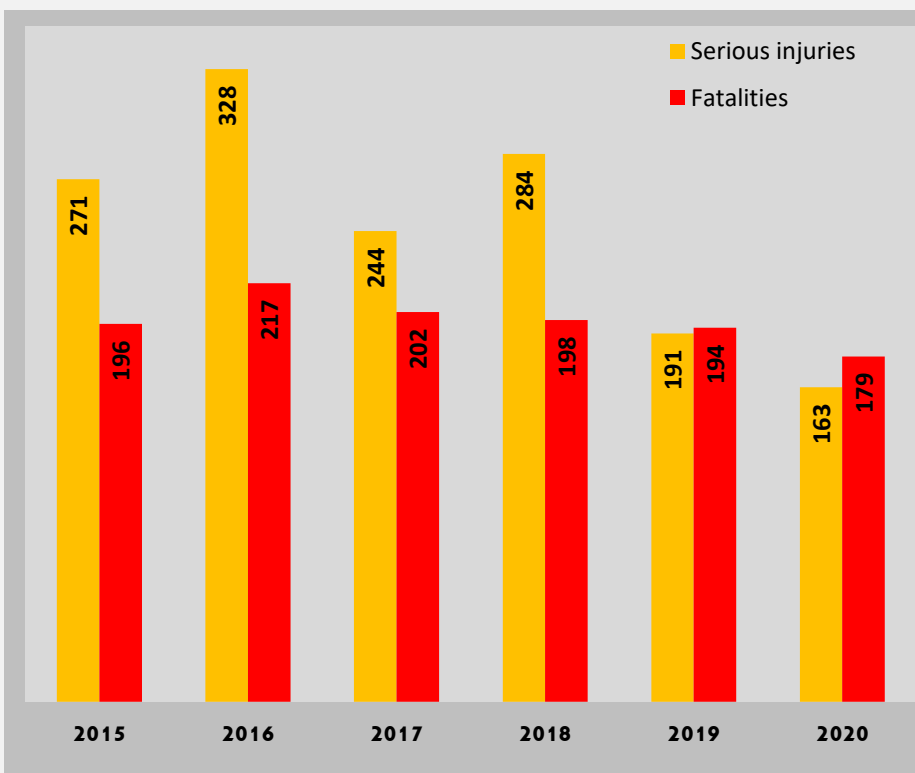
Collisions with an obstacle were stable from 2015 to 2018, then decreased -14% from 2018 to 2019 and again -6% from 2019 to 2020.

This decrease is due to collisions at level crossing, which dropped -23% since the peak of 2016.

70% of collisions with an obstacle occur at level crossings. See graph 2.16.



2.11b Victims of collisions with an obstacle



Collisions with an obstacle had fewer human consequences in 2019 and 2020 than previous years:

⇒ 1.19 victim per event in 2016

⇒ 0.92 victim per event in 2019

⇒ 0.88 victim per event in 2020

The total number of victims decreased -35% since 2016 (fatalities: -18% and serious injuries: -47%).

In 2019, fatalities overtake serious injuries for the first time. This trend is confirmed in 2020.

Level crossing users represent 94% of the 352 victims in 2020.

2.12a Collisions between trains

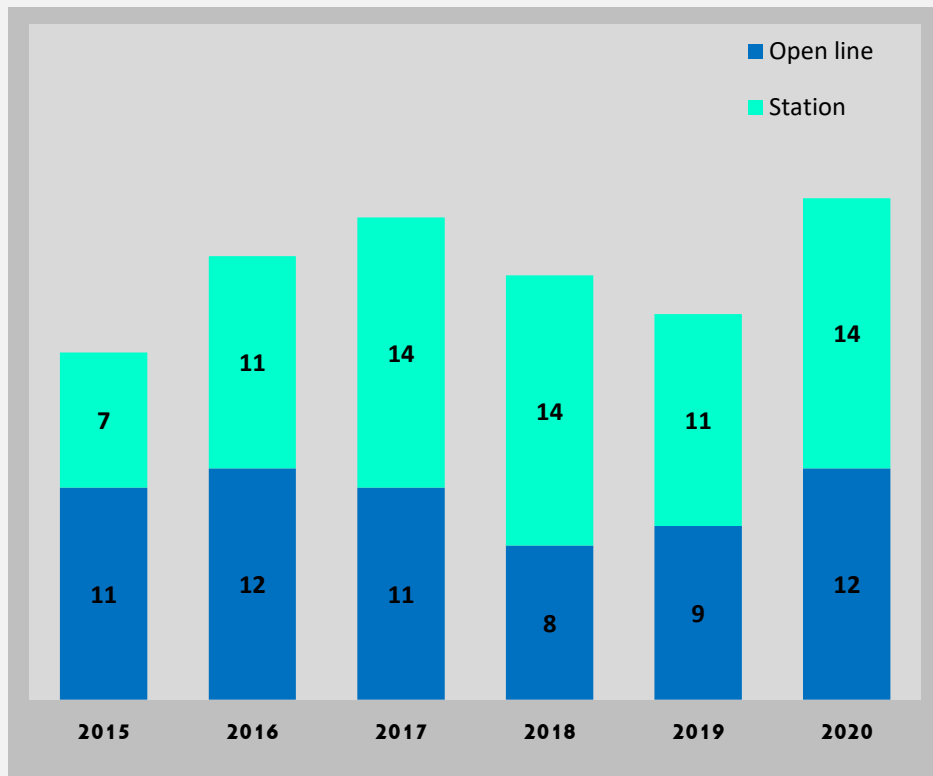
This graph excludes shunting operations.

Numbers are hopefully low. On another hand, they do not allow to determine trends.

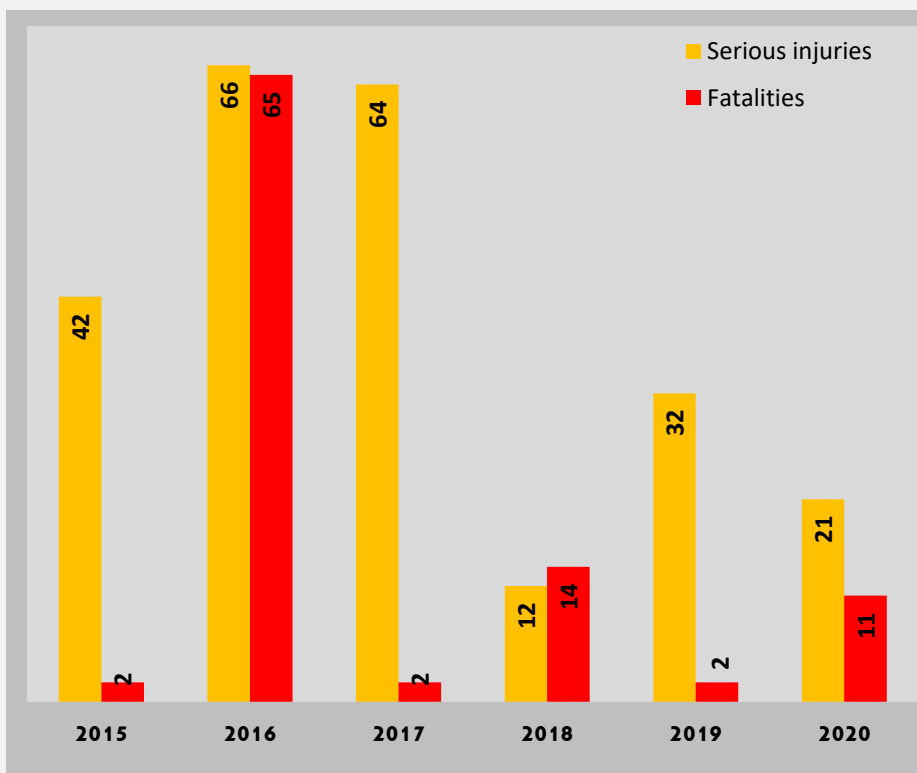
There is no correlation between the number of accidents and the number of victims. Few very severe accidents may lead to a large number of victims.

Proportion of victims caused by the 2 most severe collisions each year:

2015	75%
2016	83%
2017	68%
2018	53%
2019	93%
2020	36%



2.12b Victims of collisions between trains



On the whole period, 10 accidents led to 70% of accounted victims in collisions between trains.

Two thirds of the collisions occurred during 2020 had no human consequences.

43% of the victims recorded in 2020 were passengers and 57% were staff.

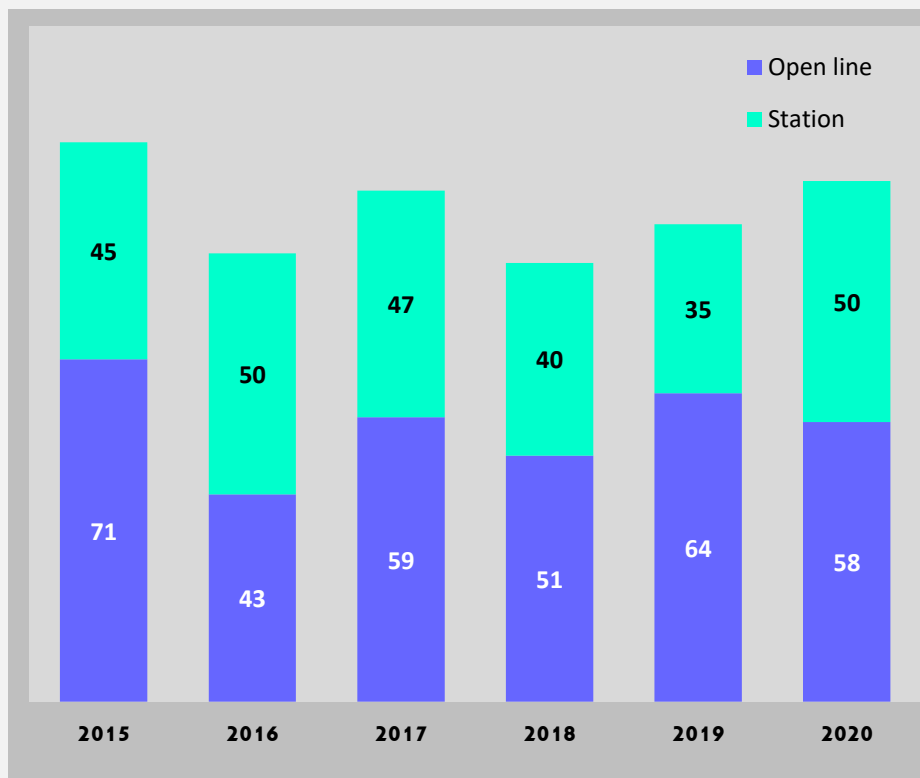
Only one collision between trains lead to passenger fatalities (2 fatalities).

2.13a Derailments

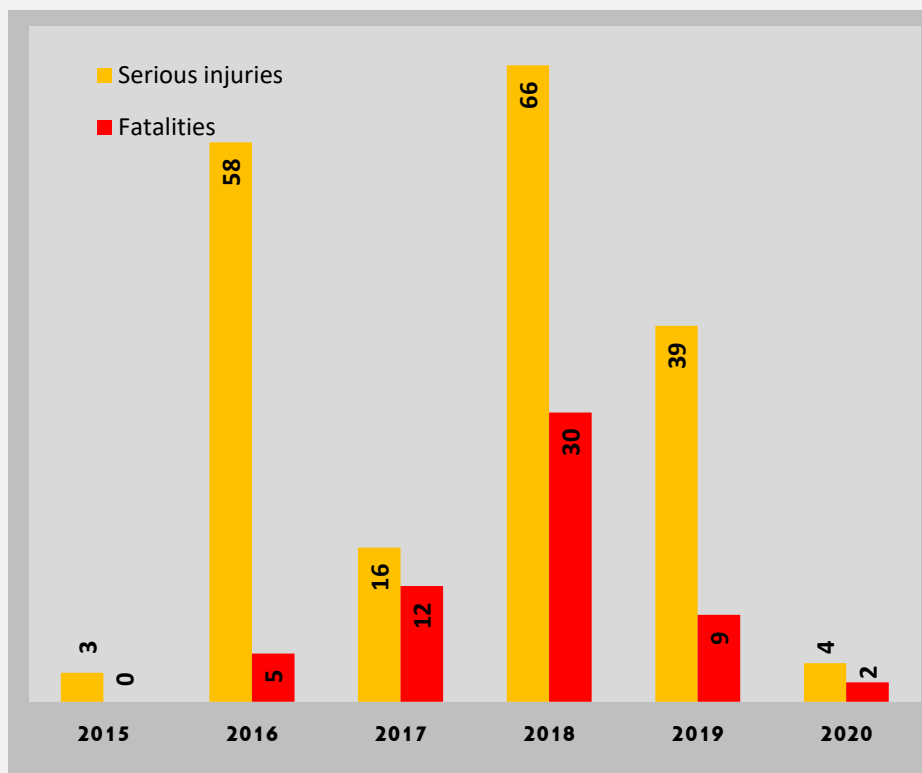
The number of derailments is stable since 2015 (around 100 per year).

59% of derailments in the year 2020 concerned freight trains (against respectively 30% passenger trains and 11% infrastructure trains and other trains).

The graph excludes shunting operations (there were 36 derailments during shunting operations).



2.13b Victims of derailments



95% of all derailments during the period had no human consequences.

Four accidents generated 62% of all fatalities and 76% of all serious injuries.

16 accidents were fatal during the period, of which 1 occurred in 2020.

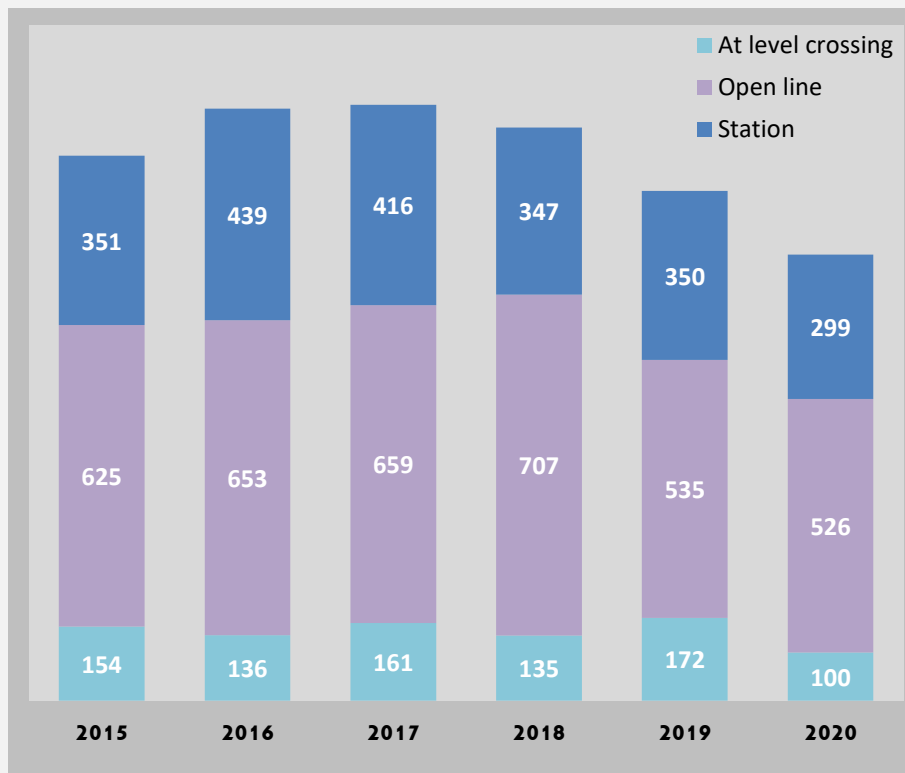
In 2020 were recorded 2 staff fatalities, 3 serious staff injuries and 1 serious passenger injury.

2.14a Individuals hit by a train: accidents

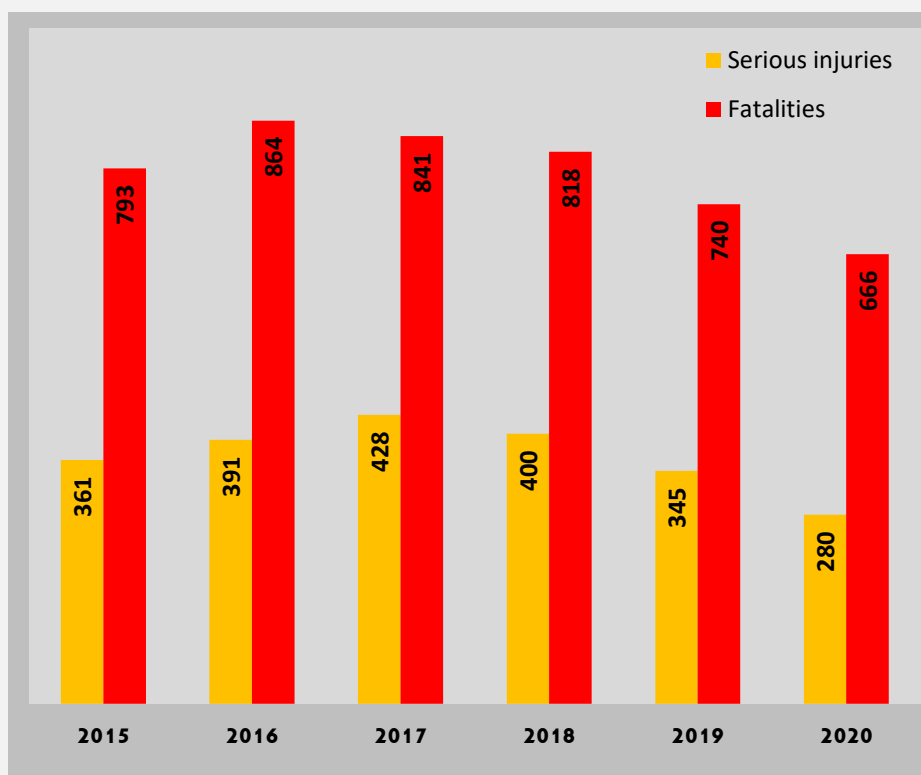
The number of accidents remained stable from 2015 to 2018. It decreased in 2019 (-172 accidents on open line) and again in 2020 (-51 accidents in station and -72 accidents at level crossing).

This may be explained by the exceptional restrictions on mobility: less road traffic led to less accidents at level crossing and less persons on platforms led to less accidents in station.

The total number of individuals hit by a train during 2020 is the lowest number observed since 2006.



2.14b Individuals hit by a train: victims



Individuals being hit by a train is fatal in two thirds of events. This proportion remains stable along the years.

Split of victims in 2020:

- ⇒ Trespassers 79%
- ⇒ LC users 11%
- ⇒ Persons hit on platform 6%
- ⇒ Staff 4%

Split of accidents per number of victims in 2020:

- ⇒ 1 victim: 906 events (98%)
- ⇒ 2 victims: 17 events
- ⇒ 3 victims: 2 events

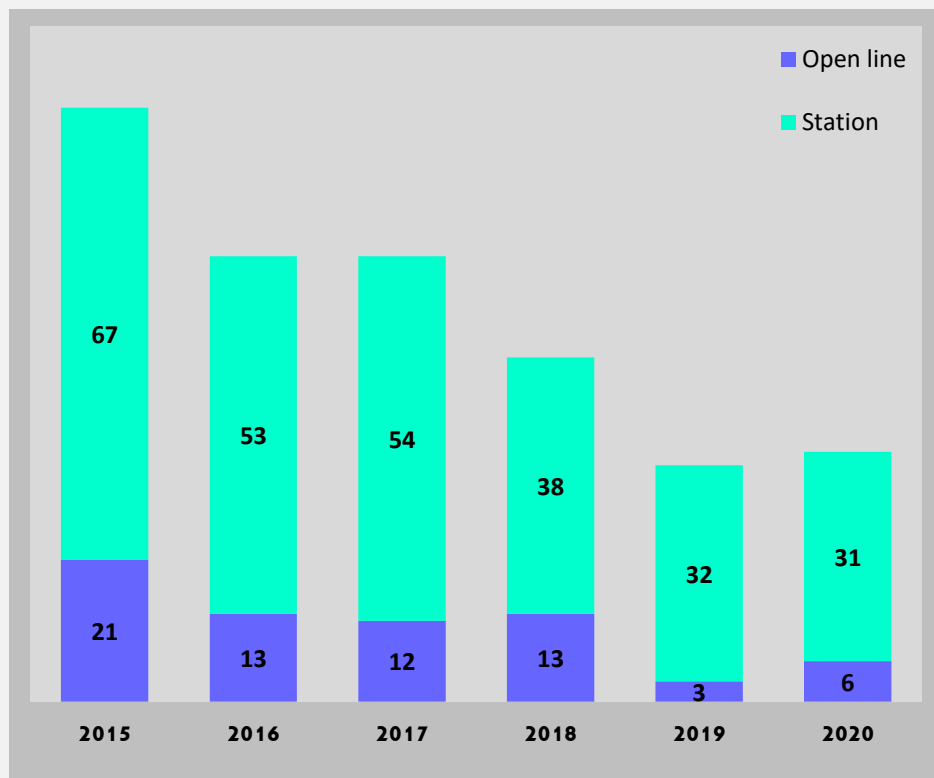
2.15a Individuals falling from a train: accidents

Individuals falling from a train are less and less common. This type of accident now represents 2% of all accidents (7% ten years ago).

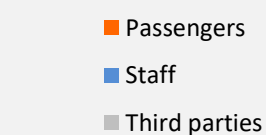
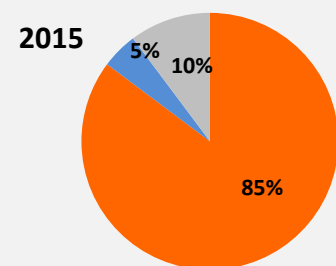
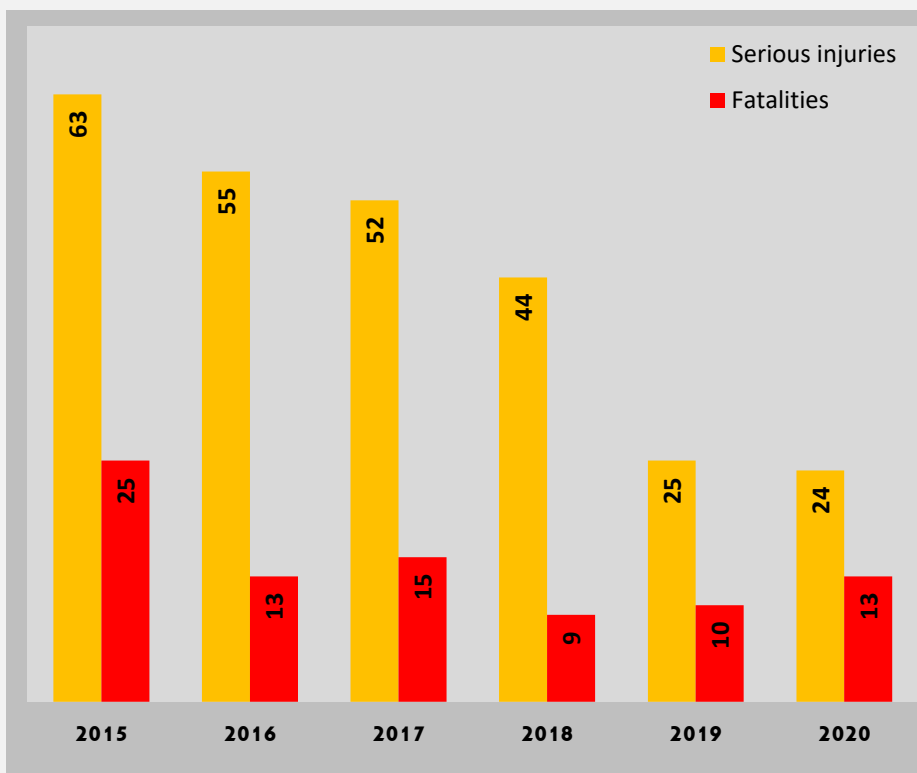
Most events occurred at station.

During the year 2020, passengers were involved in 29 cases, staff and trespassers in 4 cases each.

The graph excludes shunting operations.



2.15b Individuals falling from a train: victims



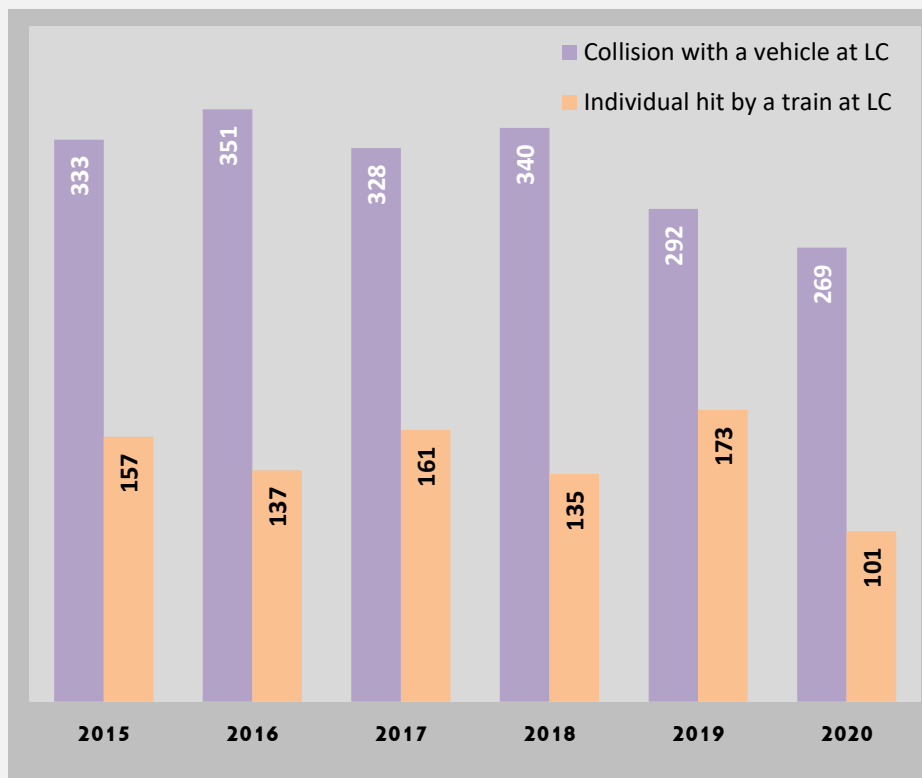
2.16a Accidents at level crossings

After years of stability, the number of accidents at level crossing decreased slightly in 2019 and again in 2020:

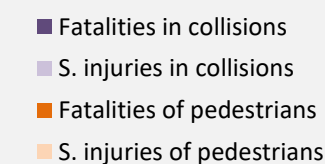
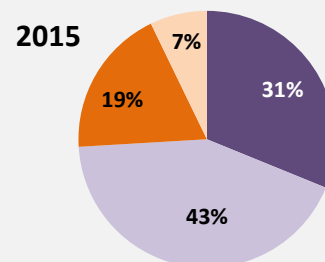
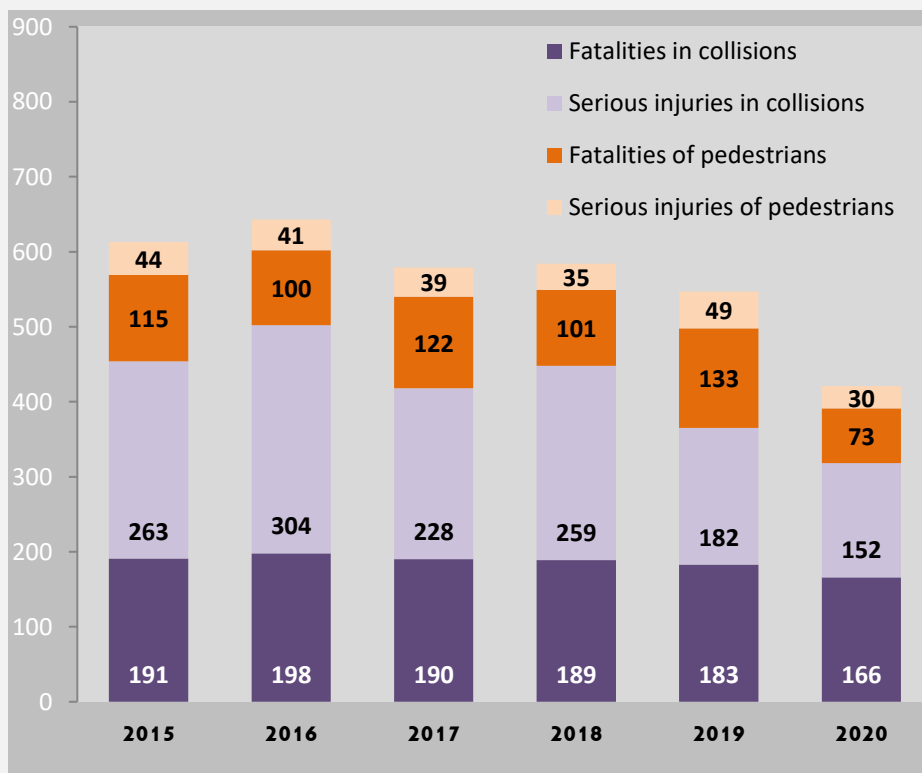
⇒ Collisions with a road vehicle decreased -19% on the whole period.

⇒ Accidents involving pedestrians and cyclists decreased -36% on the whole period.

The split of victims shows a relative increase of fatalities in collisions (see graph below). Fatalities represent 57% of victims in 2020 (50% in 2015).

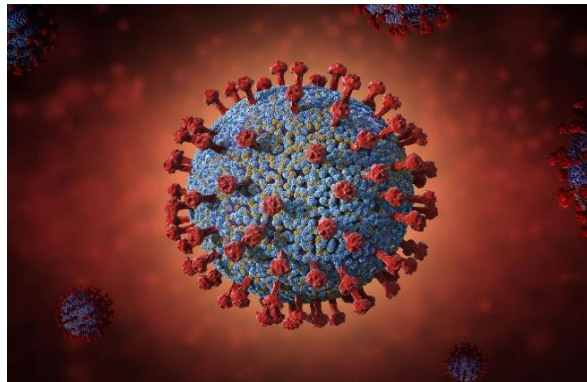


2.16b Victims of accidents at level crossings



Part 3

Focus on the effect of the COVID-19 pandemic on traffic and accidentality



In early 2020 the first reports about a new virus came from China. In February the virus was spreading across the globe and reached alarming levels in March, putting high stress on healthcare systems. The situation was called a worldwide pandemic under the name of COVID-19. This led to lockdowns, curfews and less traffic on road and rail differing by country and time-periods.

In this Part 3 we try to give a first insight in the consequences of these circumstances differing from all former years. For the first time we show evolution of data within one year. Mostly we show significant accident data related to the number of train kilometres and relative to the same month in 2019. This type of analysis will probably answer some questions, but also create new ones...

Bart Hoogcarspel

Focus on the effect of the COVID-19 pandemic on traffic and accidentality

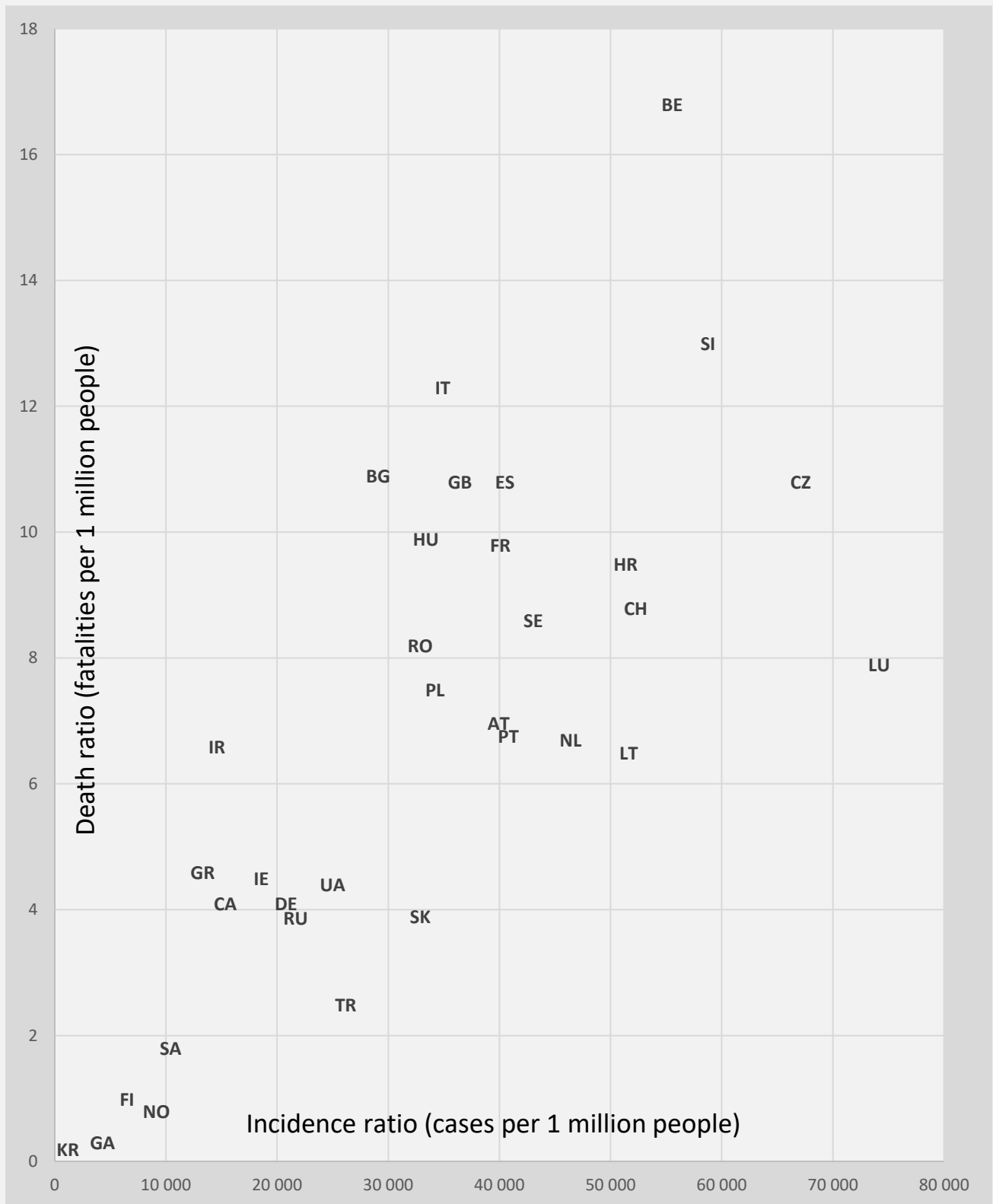
- 3.01 Reported COVID-19 cases and fatalities for the whole year 2020
- 3.02 Countries per severity of the pandemic during 2020
- 3.03 Freight and passenger traffic by month 2019-2020
- 3.04 Passenger traffic by month 2019-2020
- 3.05 Freight traffic by month 2019-2020
- 3.06a Significant accidents by month 2019-2020
- 3.06b Significant accidents per million train-km by month 2020
- 3.07 Accidents involving passenger trains per million passenger train-km by month 2020
- 3.08 Accidents involving freight trains per million freight train-km by month 2020
- 3.09 Significant accidents with internal causes by month 2020
- 3.10 LC accidents per million train-km by month 2020
- 3.11 "Individuals hit outside LC" accidents per million train-km by month 2020
- 3.12 "Individuals hit in station" accidents per million train-km by month 2020
- 3.13 Victims per million train-km by month 2020
- 3.14 Fatalities per million train-km by month 2020
- 3.15 Safety Index per million train-km by month 2020

3.01 Reported COVID-19 cases and fatalities for the whole year 2020

	Population	Cases	Fatalities	Incidence ratio ¹	Death ratio ²
AT	9,01	360 815	6 222	40 060	6,9
BE	11,64	646 496	19 528	55 540	16,8
BG	6,95	202 266	7 576	29 110	10,9
CA	38,07	584 409	15 762	15 350	4,1
CH	8,65	452 296	7 645	52 260	8,8
CZ	10,71	718 661	11 580	67 110	10,8
DE	84,07	1 760 520	33 791	20 940	4,0
ES	46,77	1 893 794	50 320	40 490	10,8
FI	5,54	36 107	561	6 520	1,0
FR	65,28	2 616 902	64 267	40 090	9,8
GA	2,23	9 571	64	4 300	0,3
GB	68,24	2 488 780	73 512	36 470	10,8
GR	10,42	138 850	4 838	13 320	4,6
HR	4,11	210 837	3 920	51 360	9,5
HU	9,66	322 514	9 537	33 390	9,9
IE	4,94	91 779	2 237	18 590	4,5
IR	83,97	1 225 142	55 223	14 590	6,6
IT	60,38	2 107 166	74 159	34 900	12,3
KR	51,47	61 769	917	1 200	0,2
LT	2,75	141 955	1 796	51 640	6,5
LU	0,63	46 415	495	74 150	7,9
NL	17,17	796 981	11 432	46 410	6,7
NO	5,42	49 567	436	9 140	0,8
PL	37,85	1 294 878	28 554	34 210	7,5
PT	10,20	413 678	6 906	40 570	6,8
RO	19,24	632 263	15 767	32 870	8,2
RU	146,00	3 127 347	56 271	21 420	3,9
SA	34,81	362 741	6 223	10 420	1,8
SE	10,16	437 379	8 727	43 040	8,6
SI	2,08	122 152	2 697	58 760	13,0
SK	5,46	179 543	2 138	32 890	3,9
TR	84,33	2 208 652	20 881	26 190	2,5
UA	43,46	1 086 997	19 281	25 010	4,4

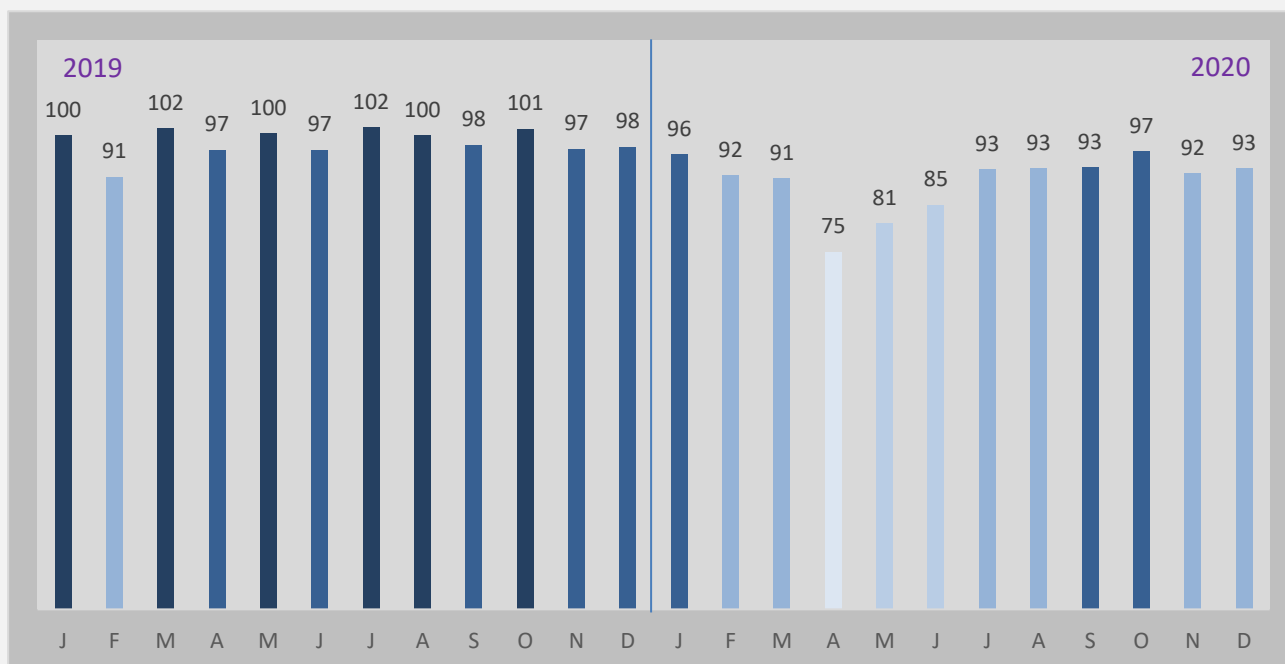
¹ Cases per one million people² Fatalities per one million peoplesource: Johns Hopkins University (github.com/CSSEGISandData/COVID-19)

3.02 Countries per severity of the pandemic during 2020



source: Johns Hopkins University (github.com/CSSEGISandData/COVID-19)

3.03 Freight and passenger traffic by month 2019-2020

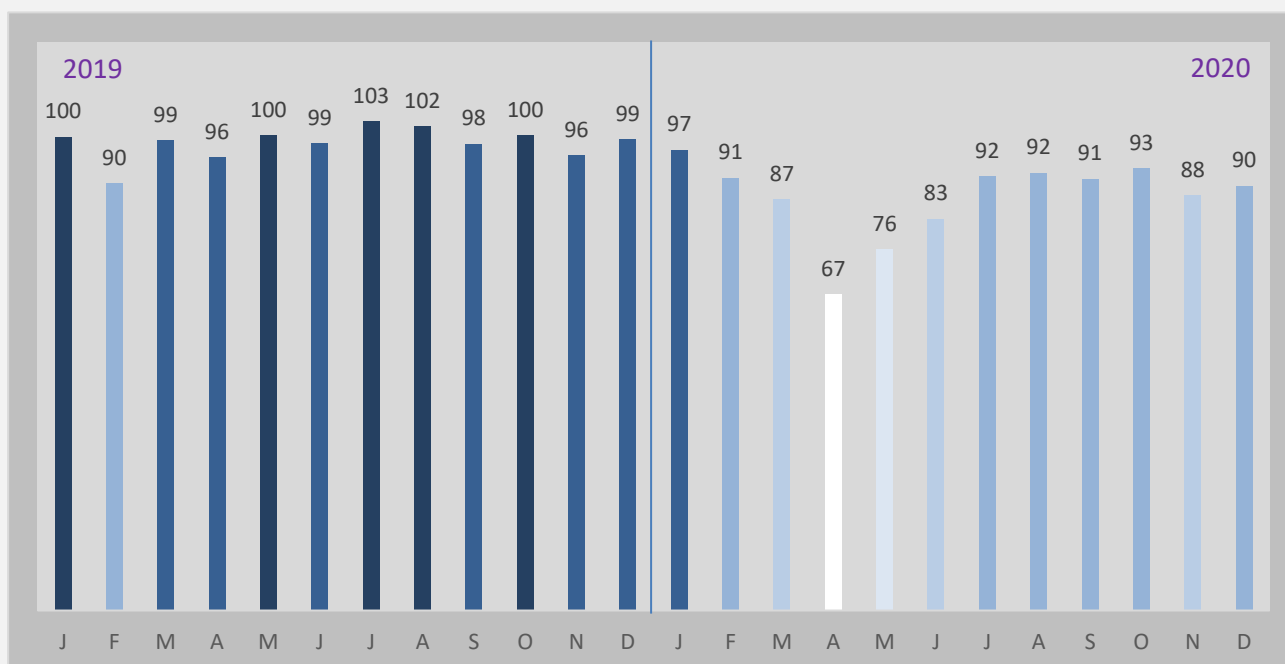


Perimeter: 20 countries

base 100 = january 2019

Full set of data only available for BE BG CH CZ DE ES FI HR HU IT LT NL PL PT RO RU SE SI SK TR

3.04 Passenger traffic by month 2019-2020

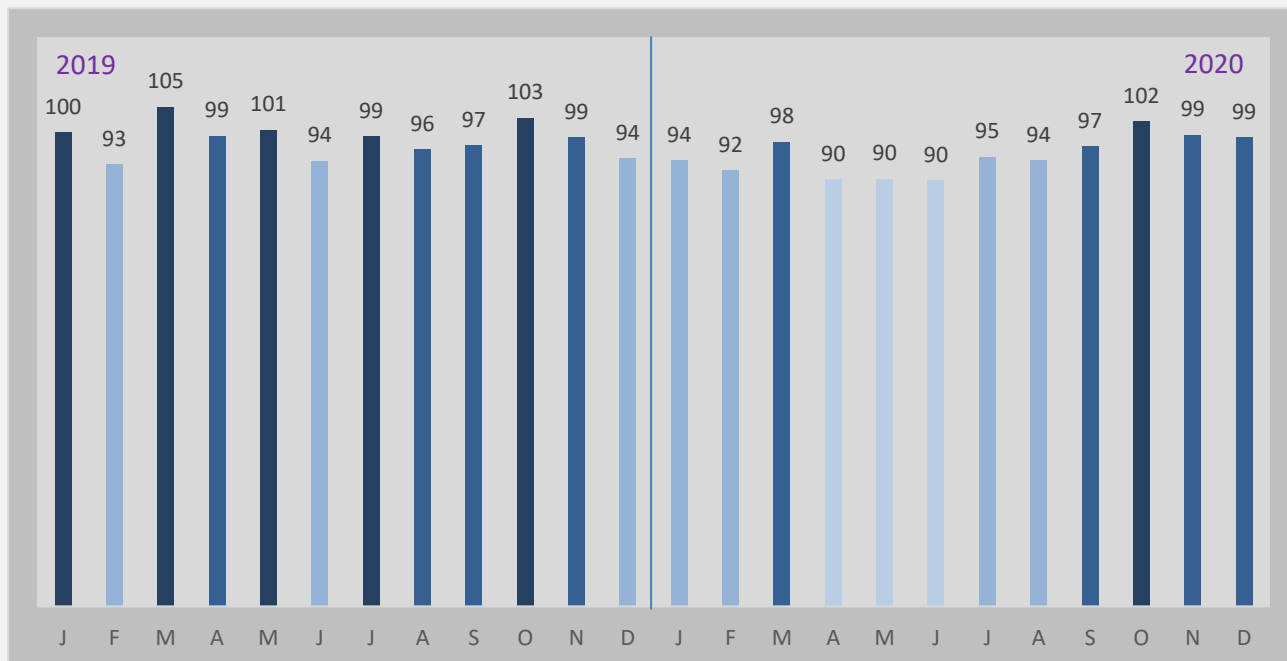


Perimeter: 20 countries

base 100 = january 2019

Full set of data only available for BE BG CH CZ DE ES FI HR HU IT LT NL PL PT RO RU SE SI SK TR

3.05 Freight traffic by month 2019-2020

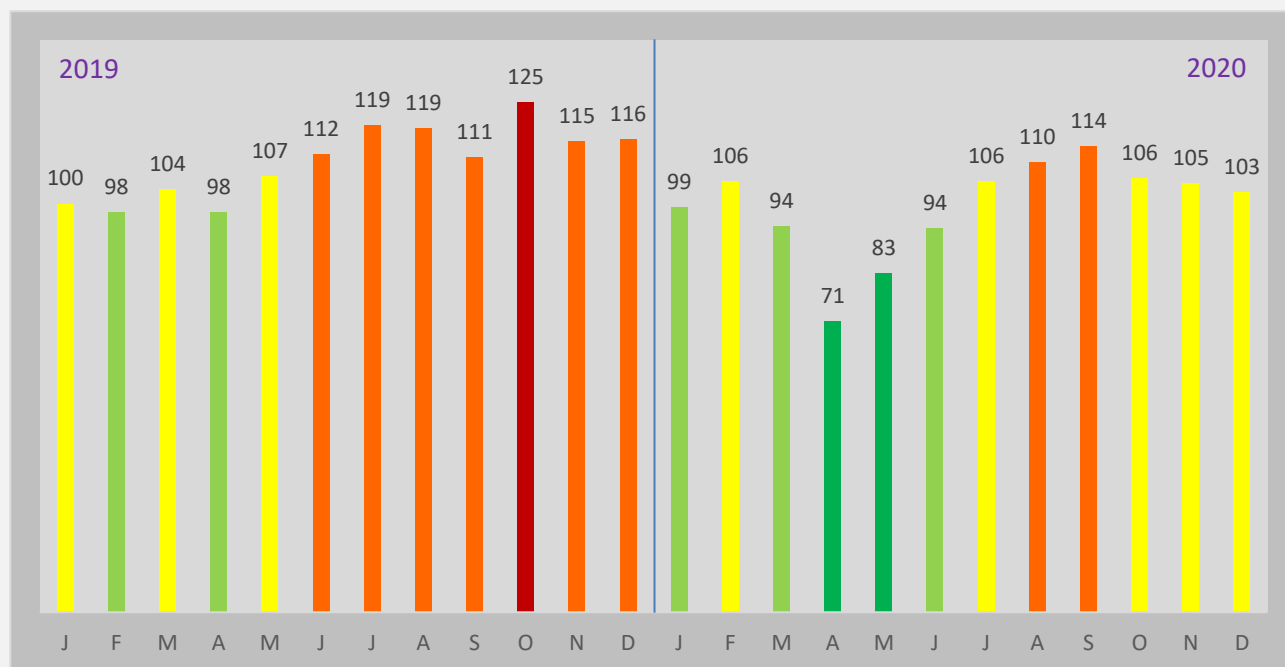


Perimeter: 20 countries

base 100 = january 2019

Full set of data only available for BE BG CH CZ DE ES FI HR HU IT LT NL PL PT RO RU SE SI SK TR

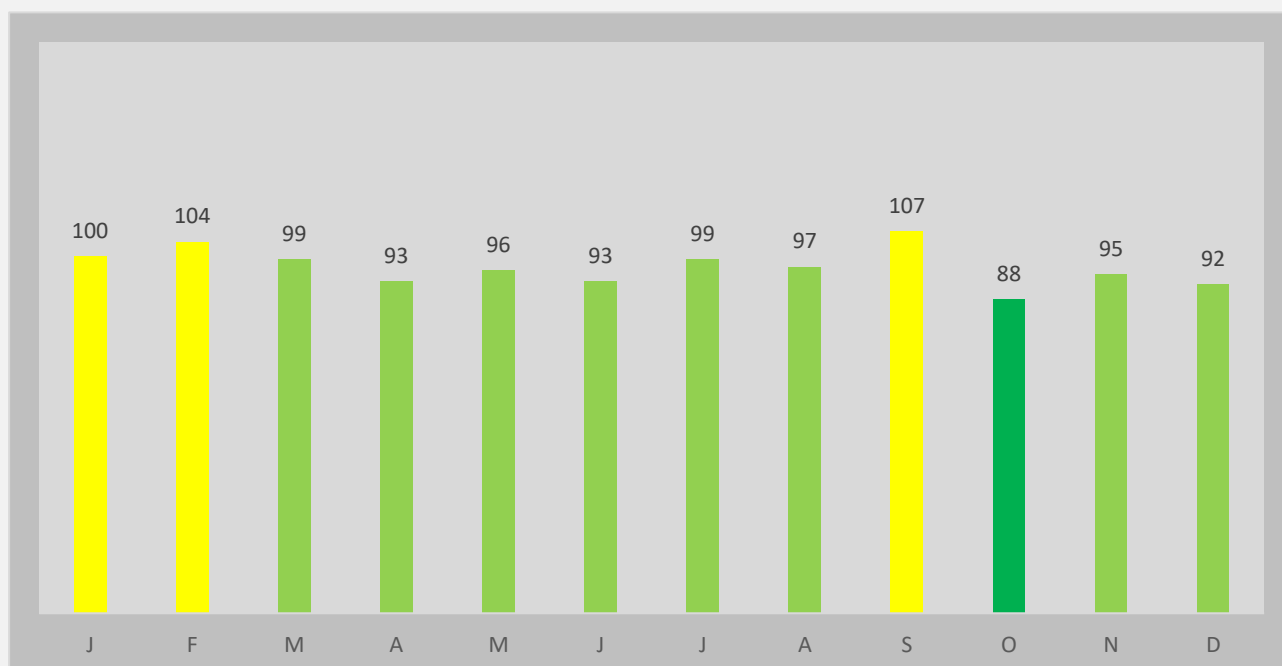
3.06a Significant accidents by month 2019-2020



base 100 = january 2019

Full set of data only available for BE CH CZ DE ES FI HR HU IT NL PL PT RO RU SE SI SK TR

3.06b Significant accidents per million train-km by month 2020

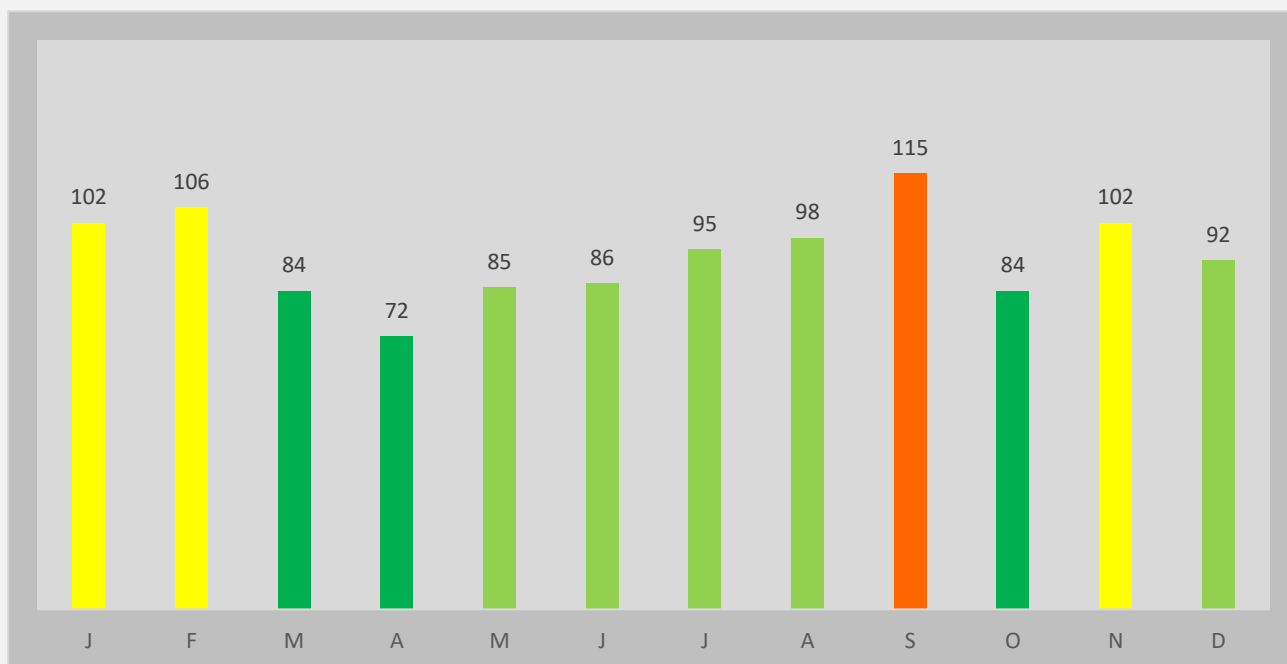


Each month 2020 is compared to same month 2019

Only train-km of freight and passenger trains

Full set of data only available for BE CH CZ DE ES FI HR HU IT NL PL PT RO RU SE SI SK TR

3.07 Accidents involving passenger trains per million passenger train-km by month 2020

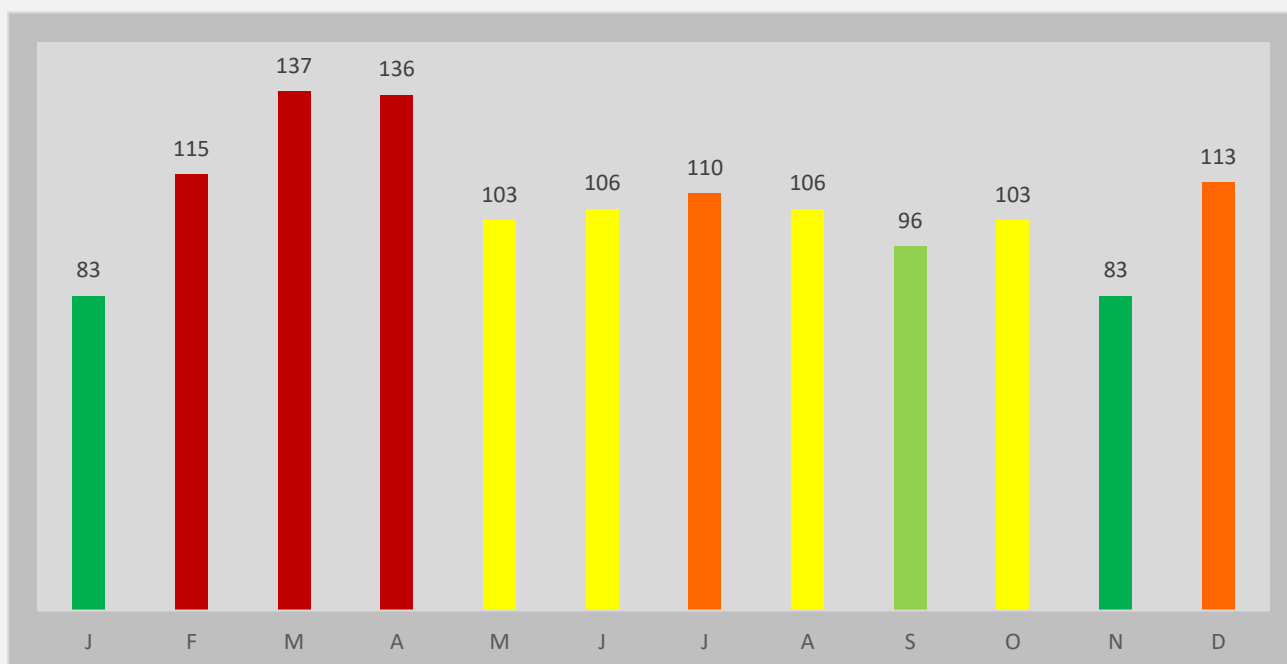


Each month 2020 is compared to same month 2019

Only train-km of freight and passenger trains

Full set of data only available for BE CH CZ DE ES FI HR HU IT NL PL PT RO RU SE SI SK TR

3.08 Accidents involving freight trains per million freight train-km by month 2020

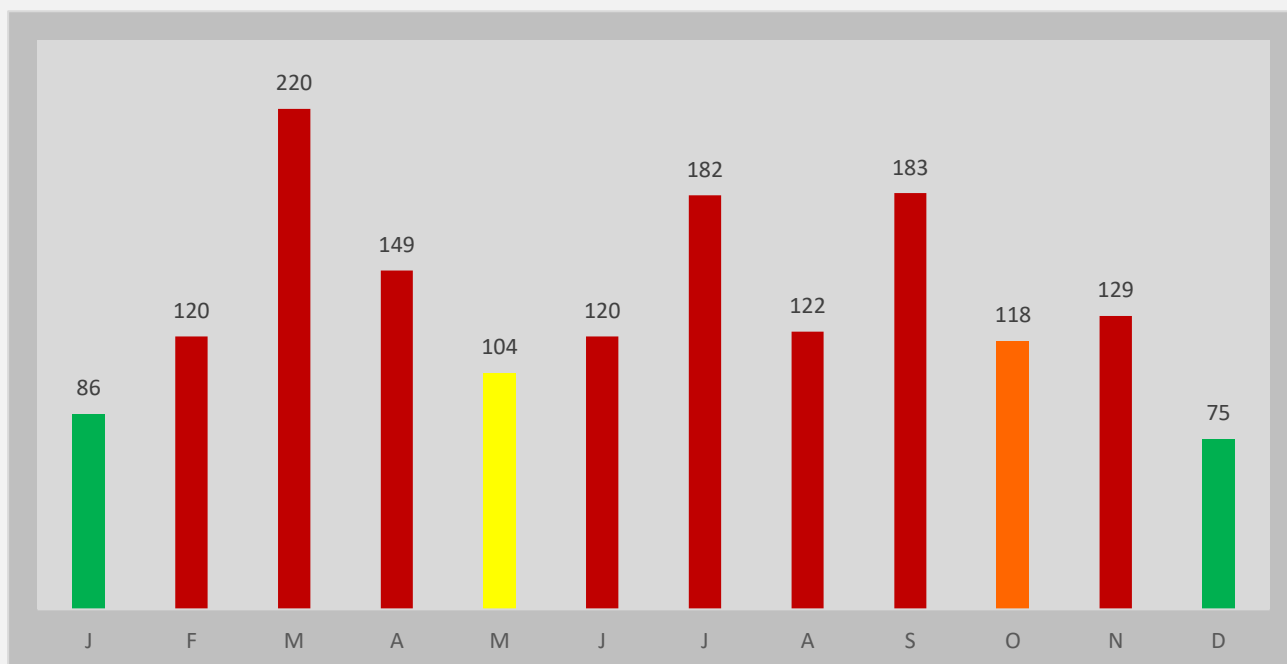


Each month 2020 is compared to same month 2019

Only train-km of freight and passenger trains

Full set of data only available for BE CH CZ DE ES FI HR HU IT NL PL PT RO RU SE SI SK TR

3.09 Significant accidents with internal causes by month 2020

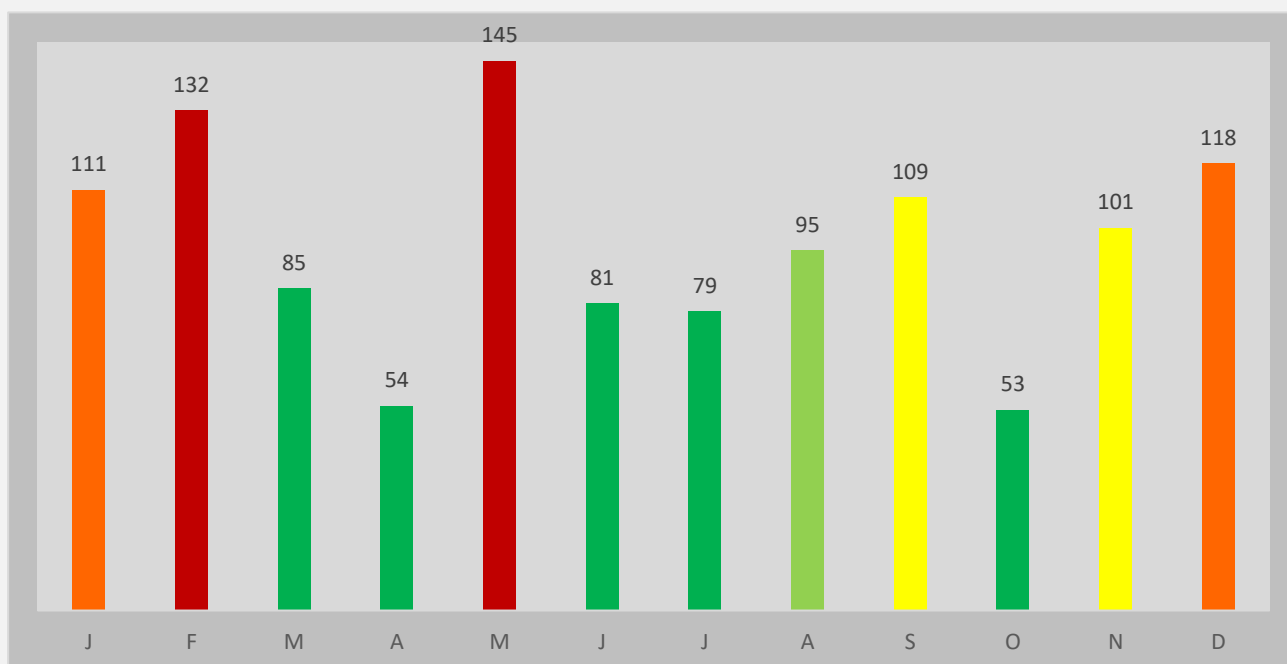


Each month 2020 is compared to same month 2019

Only train-km of freight and passenger trains

Full set of data only available for BE CH CZ DE ES FI HR HU IT NL PL PT RO RU SE SI SK TR

3.10 LC accidents per million train-km by month 2020



Each month 2020 is compared to same month 2019

Only train-km of freight and passenger trains

Full set of data only available for BE CH CZ DE ES FI HR HU IT NL PL PT RO RU SE SI SK TR

3.11 "Individuals hit outside LC" accidents per million train-km by month 2020

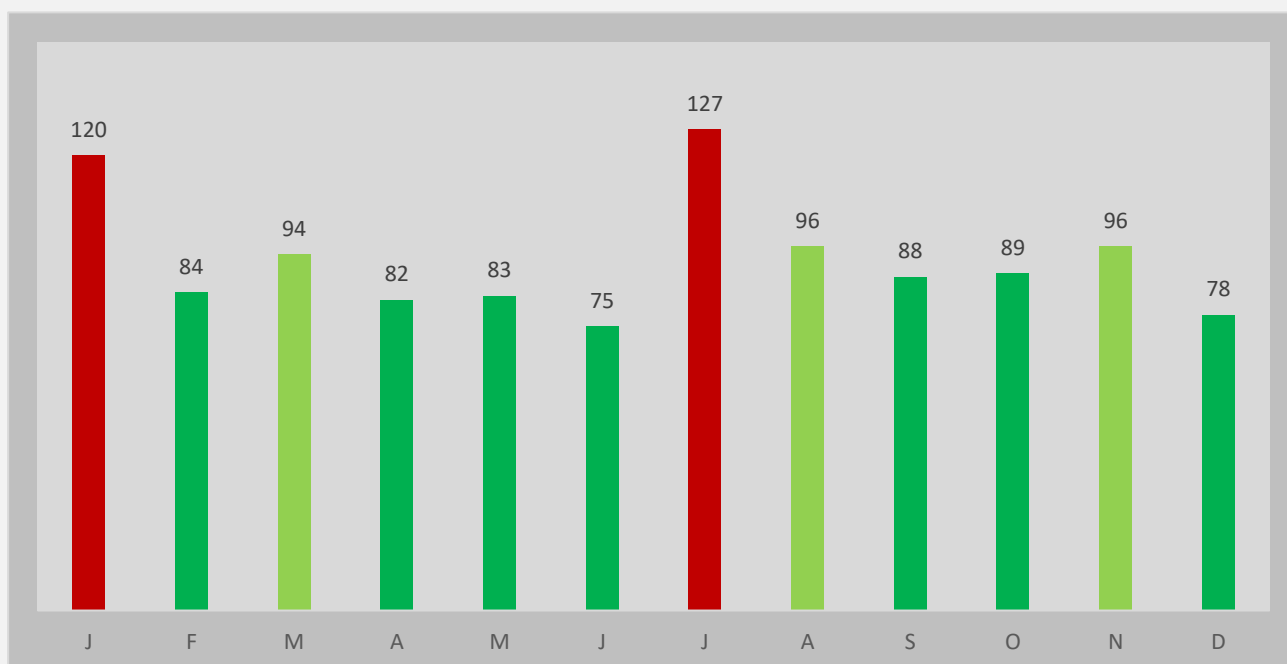


Each month 2020 is compared to same month 2019

Only train-km of freight and passenger trains

Full set of data only available for BE CH CZ DE ES FI HR HU IT NL PL PT RO RU SE SI SK TR

3.12 "Individuals hit in station" accidents per million train-km by month 2020

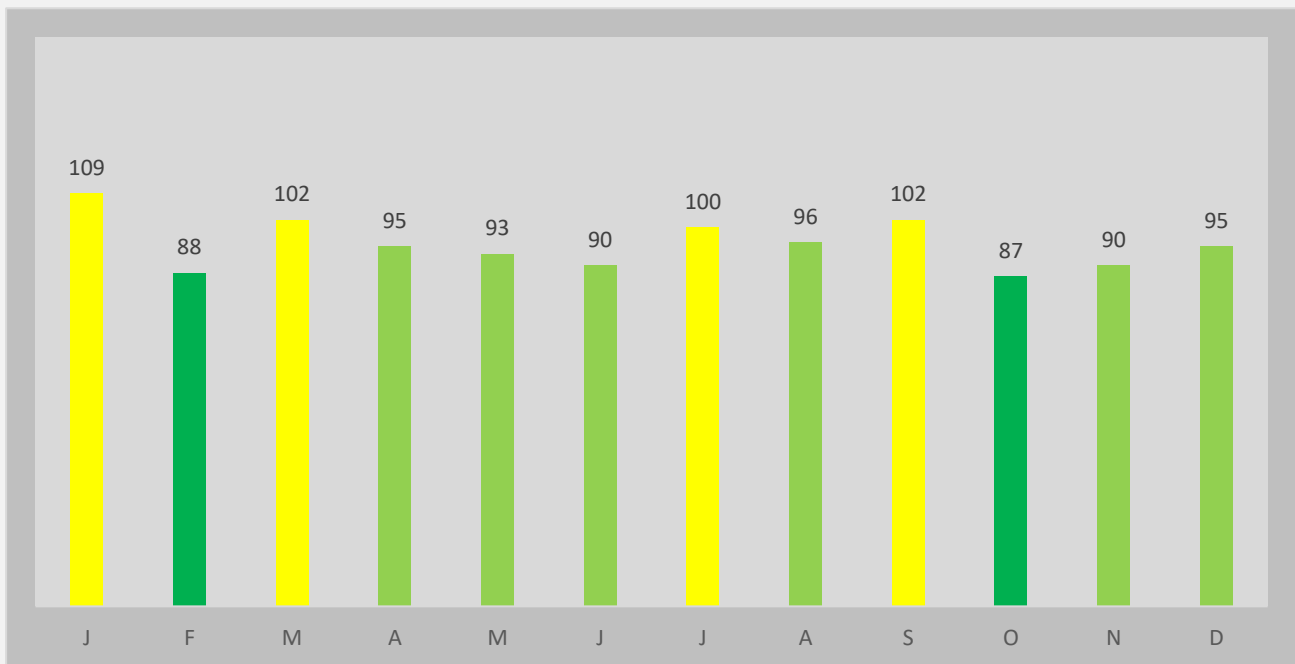


Each month 2020 is compared to same month 2019

Only train-km of freight and passenger trains

Full set of data only available for BE CH CZ DE ES FI HR HU IT NL PL PT RO RU SE SI SK TR

3.13 Victims per million train-km by month 2020



Each month 2020 is compared to same month 2019

Only train-km of freight and passenger trains

Full set of data only available for BE CH CZ DE ES FI HR HU IT NL PL PT RO RU SE SI SK TR

3.14 Fatalities per million train-km by month 2020

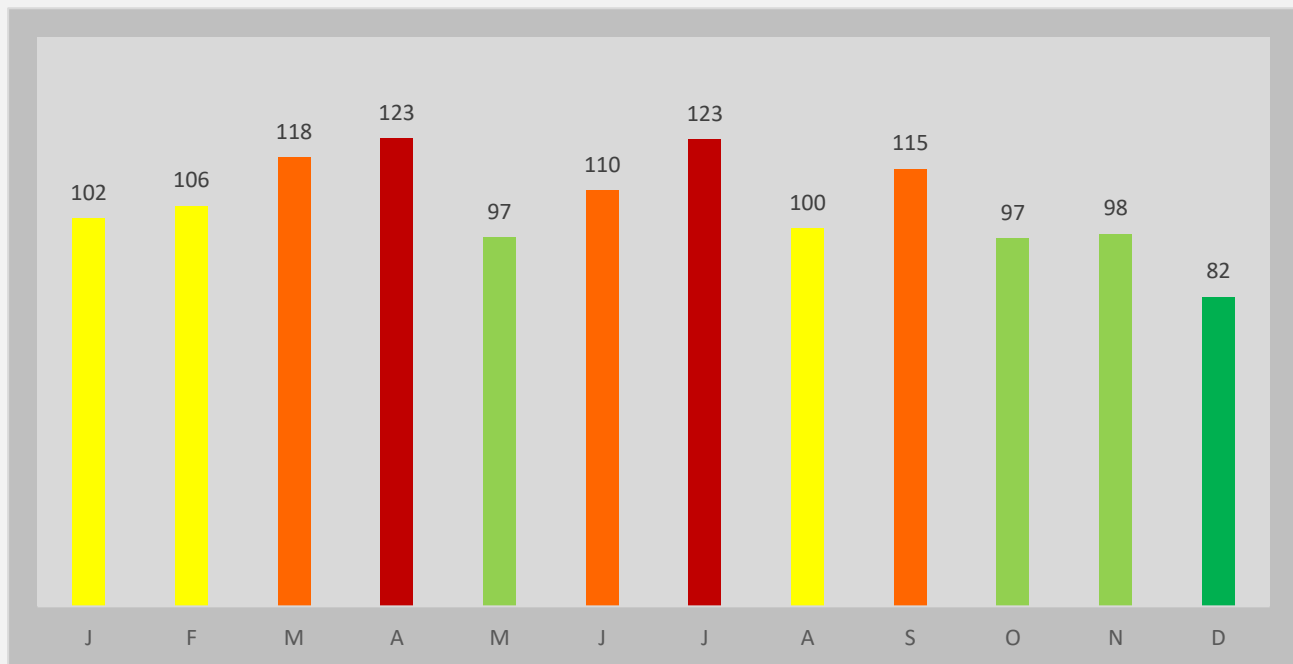


Each month 2020 is compared to same month 2019

Only train-km of freight and passenger trains

Full set of data only available for BE CH CZ DE ES FI HR HU IT NL PL PT RO RU SE SI SK TR

3.15 Safety Index per million train-km by month 2020



Each month 2020 is compared to same month 2019

Only train-km of freight and passenger trains

Full set of data only available for BE CH CZ DE ES FI HR HU IT NL PL PT RO RU SE SI SK TR

Definitions from the Commission Directive 2016/798/EC ("Safety Directive")

"Significant accident" means any accident involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in significant damage to stock, track, other installations or environment, or extensive disruptions to traffic, excluding accidents in workshops, warehouses and depots.

"Significant damage to stock, track, other installations or environment" means damage that is equivalent to EUR 150 000 or more.

"Extensive disruptions to traffic" means that train services on a main railway line are suspended for six hours or more.

UIC Safety Database

Report 2021

Significant Accidents 2020

Public report available on the UIC website

<http://safetydb.uic.org>



Contact

Olivier Georger

UIC Safety Unit

International Union of Railways

16 rue Jean Rey - F-75015 Paris

georger@uic.org

www.uic.org

INTERNATIONAL UNION OF RAILWAYS
16, rue Jean Rey - 75015 Paris - France
Tel. +33 (0)1 44 49 20 20
Fax +33 (0)1 44 49 20 29
Email: info@uic.org

Published by: UIC - Safety Unit
Director of publication: Olivier Georger
Cover and layout: Ludovic Wattignies
Photo credit: Adobe Stock
Printing: UIC

ISBN 978-2-7461-3126-2
Copyright deposit: September 2021

www.uic.org



#UICrail

